INCOMPARABLY THE BEST—SEE ANNOUNCEMENT OF PUPIL-TEACHERS' ATLASES, &c., ON OTHER SIDE.

THE

Practical Teacher

A MONTHLY EDUCATIONAL JOURNAL.

Edited by JOSEPH HUGHES.

'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more,'—COWPER.

VOL. IX. No. 8. OCTOBER, 1889. PRICE, 6D. POST FREE, 7½D.

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

EAR TRAINING—*continued.*

DIVISION IV.—STANDARDS V. AND UPWARDS.

199. Ear exercises, including **fe** or **ta** and passages in the minor mode, are a useful means of strengthening sight-singing power, and although ear tests in these points are beyond the letter of the Code, it is not unreasonable to expect that at least the Sixth Standard children should show that their exercises have not been invariably confined to the 'simple diatonic phrase.'

200. In view of the fact that phrases including **fe** or **ta** are for the most part the imperfect naming of first remove changes (see sections 89—92), the teacher should take care (1) to establish the **doh** chord firmly; (2) to sing the test immediately after the **doh** chord; (3) *not* to sing the test slowly; otherwise the sharpest pupils will find it difficult to avoid naming the phrase in the new key suggested, or they will confuse the two keys, naming partly in one and partly in the other. Thus, if the phrase **s fe l s** is sung slowly after an imperfectly remembered **doh** chord, it will most probably be called **d t_1 r d** or **s t_1 r d**. In practice it is as well to frequently give the name of the initial note. The methods of study, and especially of varying the form of giving exercises described in sections 188—196, should be freely applied. The following exercises are suggested for study:—

Ear Exercises on **fe** *and* **ta.**

s fe s	d' ta l
s fe s f m	d' s ta l
s l fe s	s ta l
m fe s	l ta l
m l fe s	d' l ta l
s r m fe s	m d' ta l
s fe f m	d' ta l t d'
m f fe s	s m ta l
s d' fe s	l ta t d'

In giving an exercise including **ta** it is expedient to sing a **te** in connection with the **doh** chord, thus: **d m s d' s t d'** or **s t d' s m d.** This is especially needful if a number of exercises on **ta** are given in succession. A plain **doh** chord in these surroundings will sound a good deal like a **soh** chord and upset the key.

201. Minor mode ear tests are generally found difficult because the tonic character of the **lah** strongly suggests the familiar name **doh.** The following order of practice is recommended: (1) the **lah** chord in any order; (2) step-wise movement commencing from some tone of the **lah** chord; (3) special practice of the above with the dominant range; (4) phrases including **ba** as commonly used in music. The following are brief examples:

Minor Mode Ear Tests.

(1) (In a medium or low key)

l_1 d m l || l_1 d l m || l_1 l d m || l_1 m d l ||
m d l_1 l || m l_1 d l || m d l l_1 || m l l_1 d ||

(2)

l_1 t_1 d l_1 || m r d l || l s f m || m f m l ||
l l se l || d' l se l || l se l d' || d r m l ||

(3) (In a high key, say lah as F or G, doh as A♭ or B♭)

l_1 m_1 d l_1 || l_1 m d l_1 || l_1 d m_1 l_1 || l_1 m m d ||
d m m l_1 || d l_1 m_1 m || m d l_1 m_1 || m_1 m d l_1 ||
l_1 se_1 l_1 d || l_1 m_1 se_1 l_1 || m l_1 se_1 l_1 || d l_1 se_1 l_1 ||
l_1 m l_1 se_1 || l_1 d l_1 se_1 || m_1 d l_1 se_1 || l_1 se_1 l_1 m ||

Bay or **ba** is almost invariably used to connect **me** and **se.** It is never used as the sharp of **fah** to connect **fah** with **soh** in the minor. The **doh** of the preceding **lah** chord should be well emphasised. The longer phrases should be sung several times, each time preceded by a **lah** chord.

(4) (In a medium or high key)

m ba se l || l d' m ba se l || l se ba se l ||
m d m ba se l || m f m ba se l || m ba se l f m ||

202. The naming of 'the time of an easy passage sung twice by the examiner' (see the Code requirement) must now be considered. As a rule the greatest difficulty in time ear exercises is in the expression of the answer. The nomenclature of time facts being so cumbersome compared with the monosyllables that name tune facts, the pupils easily forget the end of an exercise while they are struggling to name the beginning.

A first aim of the teacher, therefore, must be to train pupils to acquire a habit of attentive observation, and a power to inwardly *rehear* rhythmic effects. The pupils must be taught to recollect and imitate.

BRITISH MUSEUM

Lesson on Time-telling.

'Listen while I sing, and after I silently count ten try to imitate what you heard.' (Teacher sings, whilst beating pulses, | d :— | d .d : d || silently waits about ten seconds, and then asks the class to imitate the phrase.) 'Now, I want you to think the phrase without uttering a sound—you must try to rehear it in your mind whilst I beat. Now * *.' (Teacher beats four pulses.) 'Next, after hearing me again, I want you to say how long the first note is * * Again, what occurs in the next beat * * Again, what in the last beat.'

The following are some easy monotone phrases suitable for exercise in this way :—

d :d .d	d :— ||	d :—	— :d .d	
d :—	d :d .d || d .d :d	d :—	
d :- .d	d :— || d :- .d	d .d : d	

203. Variation in the form of exercise may be obtained by singing short rhythmic phrases to little tunes and eliciting the time value of the **doh** or the **fah**, &c.

Examples of Time-telling Exercises to be sung in Tune.

d :- .m	s :— || s :—	d .m : s	
m :r .d	s :— || s .l : s .f	m :—	
d :r	m .f : s || s :- .f	m .r : d	

204. The dictation of the notation of similar phrases to the above strengthens the connection between the ear and the eye. The Teacher spaces pulses on the board,

:	:	or	: :	: :	

and gets the pupils to dictate how the time of the passage sung is to be expressed. If the whole class can be got to write on slates or paper, the teacher will discover a great deal that will fully justify him in re-teaching the first elements of notation. Such an exercise is rarely practicable because of the time likely to be wasted in preparation, and, even where perfectly practicable, should be preceded by a course of exercises—(1) on copying notation from book or board, and (2) on writing from the dictation of the teacher.

205. The difficulty in framing answers to time ear exercises, referred to in section 202, does not exist when the time-names are employed. A well-trained class can name complications of rhythm with ease and promptness in this way. Thus the following phrase,

d .,d :d .d	d ,d .d ,d : d	

(Answer: TAAfe TAATAI tafatefe TAA)

can be named as quickly as it can be sung, because the words are an exact reflection of the rhythmic form of the exercise. But it may be said that as the time-names are not value names they are not adequate answers to the question. This is perfectly true, but, notwithstanding, the discovery of the time names of a passage is a proof that the pupil has intelligently caught the rhythm, and is of the greatest assistance to the discovery of value and notation, because the time-names cling to the memory so easily, and enable the pupil to bear the rhythm in mind while he is fixing value and notation. The present writer has frequently witnessed the dictation of the notation (tonic sol-fa and staff) of rhythmic passages more difficult than the above by kindergarten children working with the time-names. It may be doubtful whether H. M. Inspectors would accept the time-names as answers, but, in any case, their eminent usefulness in getting at values and notation is indisputable.

206. The following course covers all the elementary facts of time.

Course of Study in telling Time by Ear.

1. Measure to be told of exercises in two-pulse measure or three-pulse measure, consisting of *one*-pulse tones monotoned.

2. Tell how many pulses a note is held.

3. Tell time-names of phrases of four-pulses, including only whole pulse and half-pulse tones. Tell where taa-tai comes in such phrases. Tell the values of all the notes.

4. Tell where the rest comes in sets of four pulses, *e.g.*,

d :d	:d		d :	d :d	
d :d	d :		:d	d :d	

5. Tell how often | l :- .l || comes in
   (*a*) in a monotone phrase, and
   (*b*) in a tune sung to *laa*.

6. Tell the time-names and values or dictate the notation of short phrases like the following :—

Specimen Time-Ear Tests.

(Two-pulse measure.)

s :l	s .f : m || m :m .r	d .m : s	
s :—	d .r : m || s :- .l	s .f : m	
m .f : m .r	d :— || d :- .r	m :d	
m :—	— :d || s .f : m	s :—	

(Three-pulse measure.)

d :d :d.r	m :- .f : m || s.f : m.r : d.t$_1$	d :— :—	
s :- .f : m	m :- .r : d || d :— : r.m	d :— :—	

(In secondary measure.)

:s$_1$	d :r .m	d || :s	l .s : f .m	r	
:m.f	s :t$_1$	d || :m	f :- .t$_1$	d	
:d	m :- .f : r	d :— || :s	d.r : m :r	d :—	

(To be continued.)

—o—

Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1. 125
   86
   30
   517
   204

2. 946
   502

3. 798
   333

4. 7×3;
   2×11;
   9×4.

Second Quarter.

1. 62
390
5
846
78

2. 358
295

3. 523
18

4. 11 × 5;
4 × 8;
6 × 3.

Third Quarter.

1. 609
7
538
24
956

2. 804
376

3. 135
47

4. 4 × 4;
5 × 7;
8 × 6.

Standard II.—First Quarter.

1. 768 + 3,045 + 19,206 + 59 + 814 + 6,007.
2. Take 957 from 30,720.
3. Multiply 7,856 by 63.
4. A cask contained 460 quarts. Fifty-eight quarts were drawn off one day, and ninety-seven the next day. How many quarts were left in the cask?

Second Quarter.

1. What is the difference between 81,706 and 92,604?
2. What is the sixth part of fifty-four thousand three hundred? Write the answer in words.
3. 39,804 × 580.
4. From 79 score take 86 dozen.

Third Quarter.

1. Multiply 47,965 by 791.
2. Divide 53,890 by 8.
3. From 50,012 subtract 42,235.
4. Nine villages contained 4,581 people. How many was that for each village?

Standard III.—First Quarter.

1. 60,005 ÷ 17.
2. What is the quotient of two hundred and two thousand and twenty and 268?
3. Divide 861,650 by 950.
4. There are two pear trees in a garden. One tree has 478 pears on it, and the other has twice as many. How many pears are there on both trees?

Second Quarter.

1. From £305 16s. 1½d. subtract £47 5s. 3¾d.
2. There are 349 boys in a school. How many walnuts will be required to give 18 to each of them?
3. £765 14s. 2d. + £94 18s. 11¼d. + £58 15s. 9½d. + £20 13s. 7¾d. + £7 9s. 10½d.
4. A farmer went to market with £200. He bought two horses for £40 each, a cow for £20, and a dozen sheep for £30. How much had he left?

Third Quarter.

1. Add £47 3s. 0½d., £5,019 15s. 10¾d., £83,705 9s. 8½d., £360 17s. 6¼d., £6,008 6s. 11¼d., and £10,524 12s. 5½d.
2. Take £29,999 17s. 9¾d. from £30,000 12s. 7¼d.
3. Add together 38 pounds, 38 shillings, 38 pence, and 38 farthings.
4. Harry had 15s. and George had a sovereign. After George had spent 7s. 9d., how much more had Harry than George?

Standard IV.—First Quarter.

1. Multiply 11¾d. by 345.
2. Divide seventeen thousand and fifteen pounds by 576.
3. £78 13s. 9½d. × 89.
4. The rent of a house is £15 a quarter, and the taxes are £11 10s. a year. What is the amouut of the rent and taxes for a week?

Second Quarter.

1. Reduce 29 miles 6 fur. 13 po. to inches.
2. If a man gets 10½d. per hour, and works 9 hours a day for 5 days, and 5 hours on Saturday, how much does he earn in a week?
3. Reduce a quarter of a million ounces to cwt.
4. A field contains 2 acres. If 3 ro. 10 po. be made into a garden, how many square yards remain?

Third Quarter.

1. How many times will a watch tick in a day, if it tick every half-second?
2. If a cwt. of copper cost £8 17s. 4d., what will a lb. cost?
3. What is the value of 7 bus. 3 pks. 1 gal. 3 qts. at 2d. per quart?
4. How many pieces of iron, each 2 ft. 5 in., can be cut from 5 bars of iron, each 9 yds. 2 ft.?

Standard V.—First Quarter.

1. Find the value of 17 qrs. 4 bus. 3 pks. 1 gal. at 9s. 6d. per bushel.
2. What is the cost of a fence 789 miles long at £1 17s. 5½d. per mile?
3. Find the cost of paving 56 sq. yds. 7 ft. 24 in. at 5s. 7½d. per sq. yd.
4. What is the value of 239½ dozen articles at 16s. 10¾d. each?

Second Quarter.

1. If a bankrupt pays 7s. 6d. in the pound, what would a creditor receive for a debt of £89 14s.?
2. What is the rent of 5 fields, each 3 ac. 2 ro. 18 po., at £3 3s. 4d. per acre?
3. Bill:—
   15½ lbs. at 10½d. per lb.;
   23¾ lbs at 1s. 11d. per lb.;
   39 oz. at 8s. 4d. per lb.;
   18¼ lbs. at 2s. 3d. per lb.;
   7½ lbs. at 2½d. per oz.
4. A garrison of 120 men has provisions for 24 days. If the garrison be increased by 40 men, how long would the provisions last?

THIRD QUARTER.

1. Add the difference between $\frac{1}{4}$ and $\frac{1}{5}$ to the sum of $\frac{1}{6}$ and $\frac{1}{7}$.

2. If 20 men can do a piece of work in 18 days, how many more men must he employed to complete it 3 days earlier?

3. Simplify: $\frac{3}{8} - \frac{5}{6} - \frac{1}{4} + \frac{9}{10}$.

4. If $\frac{1}{2}$ a haystack cost £37 16s., what would $\frac{2}{3}$ of one cost?

STANDARD VI.—FIRST QUARTER.

1. Find the product of the sum and difference of $3\frac{1}{6}$ and $3\frac{1}{3}$.

2. Simplify:—

$$\frac{\frac{7}{8} + 1\frac{5}{12} - \frac{1}{6}}{3\frac{3}{10} \div (\frac{2}{7} \times 2\frac{2}{3})}.$$

3. $(7{\cdot}638 + {\cdot}2075 - 3{\cdot}08624) \div {\cdot}0185$.

4. Multiply 390 by 140, and divide the product by $\frac{1}{8}$ of 16·25.

SECOND QUARTER.

1. Reduce £4 7s. $3\frac{3}{4}$d. to the decimal of £2 19s. 6d.

2. Subtract ·27 of an hour from ·1375 of a day, and give the answer in minutes.

3. If $\frac{3}{8}$ lb. cost 7s. $10\frac{1}{2}$d., what will $1\frac{7}{12}$ cwt. cost?

4. If 9 lbs. of sugar cost as much as 2 lbs. of coffee, and sugar is £1 7s. 6d. per cwt., what will a ton of coffee cost?

THIRD QUARTER.

1. Divide the least of these fractions by the greatest:—$\frac{4}{7}$, $\frac{5}{6}$, $1\frac{1}{2}$, $\frac{7}{8}$, and $\frac{2}{3}$.

2. What will £7,805 amount to at $4\frac{1}{4}$ per cent. for $6\frac{3}{4}$ years?

3. A property is divided among A, B, and C. B's share is $\frac{2}{3}$, and C's is $\frac{3}{4}$. A's share is worth £67 10s. What is the value of the property?

4. At what rate per cent. will a sum of money treble itself in $16\frac{2}{3}$ years?

STANDARD VII.—FIRST QUARTER.

1. If £320 gain £13 1s. 4d. in 200 days, how much will £150 gain in a year?

2. A man's income-tax is 7d. in the £ one year, and 6d. in the £ the previous year. If he had remaining in the two years £817 5s., what is his income?

3. If 5 boats take 7,000 herrings in 2 days, how long would 32 boats be in taking 500 barrels, each containing 560 herrings, at the same rate?

4. What sum will amount to £790 8s. in 1 year 219 days at $2\frac{1}{2}$ per cent.?

SECOND QUARTER.

1. In a night school of 40 pupils, 17 make 58 attendances each, 11 make 56 each, 5 make 47 each, and the remainder average 35. What is the average number of attendances for each pupil?

2. In what time will a sum of money treble itself at $7\frac{1}{2}$ per cent.?

3. A man is twice as old as his daughter, and eight times as old as his grand-daughter. The daughter's age is 36. What is their average age?

4. A gentleman left £4,000 to be divided between his son and daughter in the proportion of 8 to 7; what was the share of each?

THIRD QUARTER.

1. In a school there are 245 boys and 175 girls; what percentage of the total number are the girls?

2. An agent has to receive $12\frac{1}{2}$ per cent. of the profits of an estate which cost £17,890. What must be the selling price so that he may receive £265?

3. By selling eggs at 8d. per dozen a tradesman gains $33\frac{1}{3}$ per cent. What must he sell them at per score to gain 20 per cent.?

4. If by selling goods for £7 16s. I gain 30 per cent., what shall I gain by selling them for 8 guineas?

ANSWERS.

STANDARD I.

	FIRST.	SECOND.	THIRD.
1.	962.	1,381.	2,134.
2.	444.	63.	428.
3.	465.	505.	88.
4.	21; 22; 36.	55; 32; 18.	16; 35; 48.

STANDARD II.

	FIRST.	SECOND.	THIRD.
1.	29,899.	10,898.	37,940,315.
2.	29,763.	9,050.	6,736 + 2.
3.	494,928.	23,086,320.	7,777.
4.	305 quarts.	548.	509 people.

STANDARD III.

	FIRST.	SECOND.	THIRD.
1.	3,529 + 12.	£258 10s. $9\frac{3}{4}$d.	£105,666 5s. $7\frac{1}{4}$d.
2.	753 + 216.	6,282 walnuts.	14s. $9\frac{1}{2}$d.
3.	907.	£947 12s. $4\frac{3}{4}$d.	£40 1s. $11\frac{1}{2}$d.
4.	1,434 pears.	£70.	2s. 9d.

STANDARD IV.

	FIRST.	SECOND.
1.	£16 17s. $9\frac{1}{2}$d.	1,887,534 inches.
2.	£29 10s. $9\frac{1}{2}$d. + 192 q.	£2 3s. 9d.
3.	£7,003 7s. $5\frac{1}{2}$d.	139 cwt. 2 qrs. 1 lb.
4.	£1 7s. 6d.	5,747$\frac{1}{2}$ sq. yds.

	THIRD.	
1.	172,800 times.	3. £2 2s. 6d.
2.	1s. 7d.	4. 60 pieces.

STANDARD V.—FIRST.

1.	£66 18s. $3\frac{3}{4}$d.	3.	£15 19s. $5\frac{3}{4}$d.
2.	£1,477 14s. $7\frac{1}{2}$d.	4.	£2,427 18s. $7\frac{1}{4}$d.

SECOND.

1. £33 12s. 9d.
2. £57 3s. $11\frac{1}{2}$d.
3. 13s. $6\frac{1}{2}$d. + £2 5s. $6\frac{1}{4}$d. + £1 0s. $3\frac{3}{4}$d. + £2 1s. $0\frac{3}{4}$d. + £1 5s. = £7 5s. $5\frac{1}{2}$d.
4. 18 days.

	THIRD.		
1.	$\frac{11}{14}$.	3.	$1\frac{33}{70}$.
2.	4 men.	4.	£50 8s.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$\frac{121}{560}$.	1·446428571.	$\frac{39}{56}$.
2.	$\frac{61}{3300}$.	181$\frac{1}{2}$ minutes.	£10,044 1s. $2\frac{1}{4}$d.
3.	257·25725.	£68 12s.	£300.
4.	16,800.	£123 15s.	12 per cent.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	£11 3s. $6\frac{3}{4}$d.	52$\frac{1}{19}$ attendances.	41$\frac{2}{3}$ per cent.
2.	£420.	26$\frac{2}{3}$ years.	£20,010.
3.	12$\frac{1}{2}$ days.	39 years.	1s.
4.	£760.	Son, £2,133 6s. 8d. Daughter, £1,866 13s. 4d.	40 per cent.

Practical Kindergarten Lessons for English Elementary Schools.

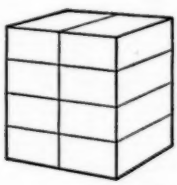
BY MRS. MORTIMER.

Lecturer at the Home and Colonial Training College.

VIII.

Gift IV.

Examples of Lessons.—*Forms of Life.*



This gift consists of a box the same size as in Gift III., containing a cube, cut once vertically and three times horizontally, thus producing eight oblong pieces each two inches long, one inch wide, and half-an-inch thick. These blocks are often called bricks, because they have the same relative measurements as the ordinary bricks.

This gift may be used by the same children that use Gift III., and is introduced to them in the same way. The boxes are passed, examined, and then opened. The children notice that at first the gift appears the same as the third, but when they knock the cube, and it falls into pieces, they discover that it is different. They count the pieces and find that there are eight, as there are eight cubes in Gift III. One piece of each of these gifts, *i.e.*, III. and IV., should now be examined and compared with each other. The children will find out that each piece has six faces, eight corners, and twelve edges; but whereas the faces of the cube are all of the same shape and size, the faces of the new piece vary both in shape and size. The children should be led to notice that there are three different kinds of faces, two of each shape and size. By means of this gift the children become familiar with the oblong, and are very soon able to readily distinguish it from the square. The difference between the length, breadth, and depth of a solid is also shown by means of this gift. This gift may be used for precisely the same purposes as the former one, viz., for making Forms of Life, Forms of Knowledge, and Forms of Beauty. The Forms of Life made with this gift are really prettier and more numerous than those made with the third gift, owing to the greater variety in the dimensions of its parts. (Plates VI. and VII.)

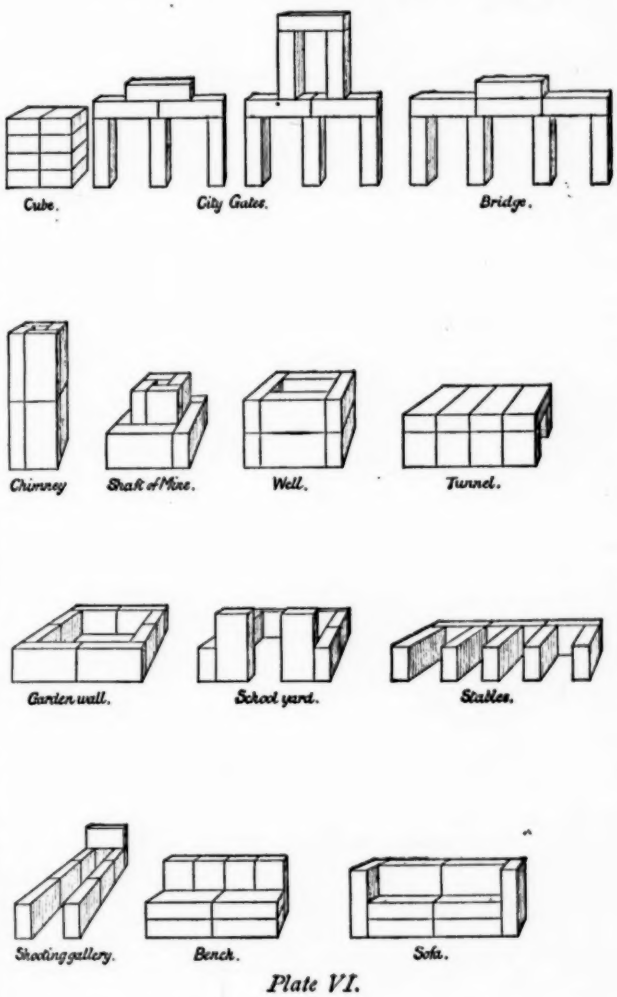
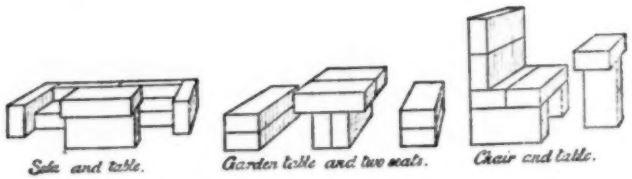


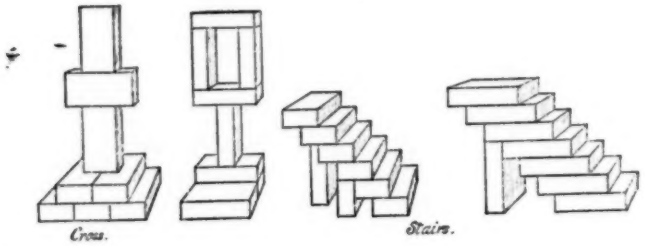
Plate VI.

The Forms of Beauty are also more numerous, as the figures can be subjected to a variety of changes by simply placing the blocks on their long or short sides; or, as the children say, by letting them 'stand up' or 'lie down.' (Plates VIII. and IX.)

Number can be taught as in the preceding gift. Squares and oblongs of different sizes can be made. (Plate X.)

All the rules for building given in connection with the third gift apply equally to the fourth.





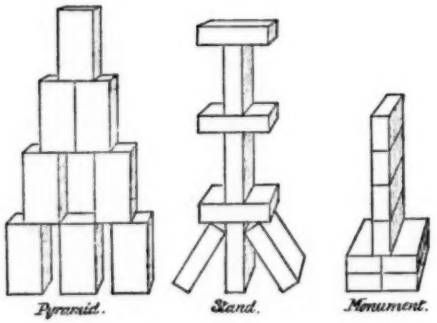


Plate VII.

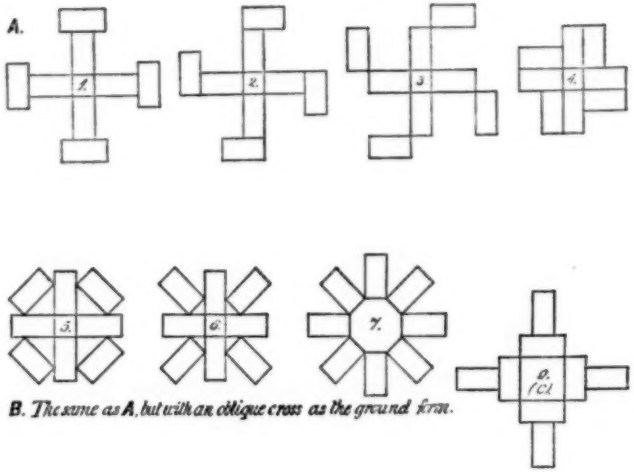


Plate VIII.

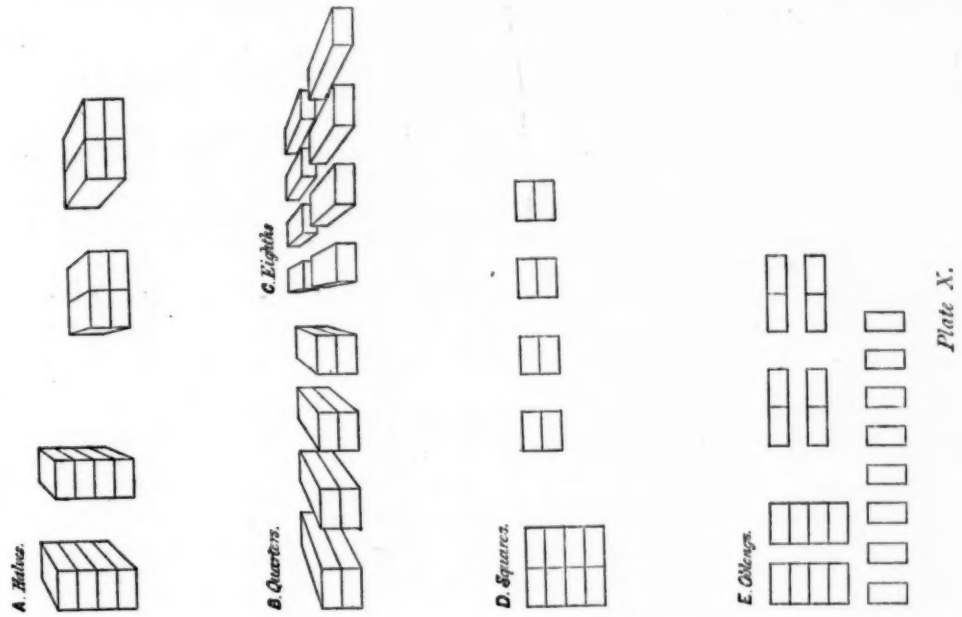


Plate X.

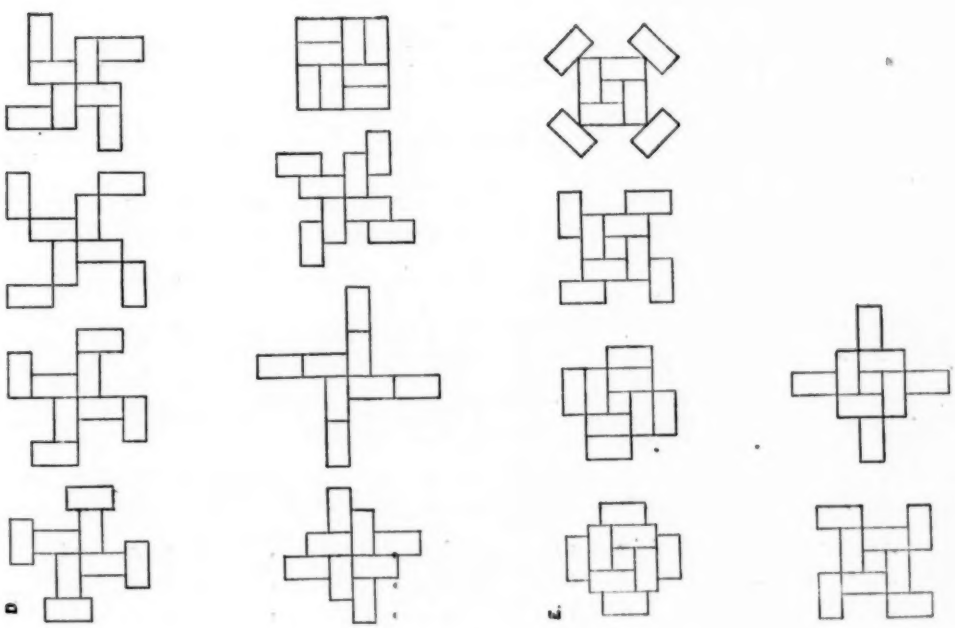
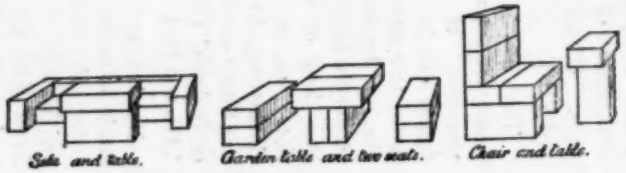
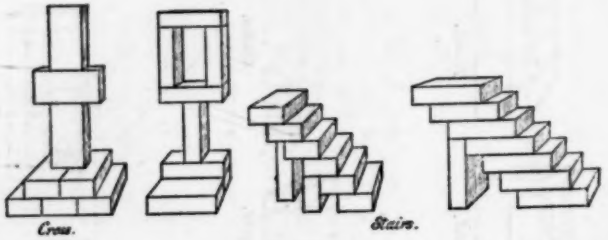


Plate IX.





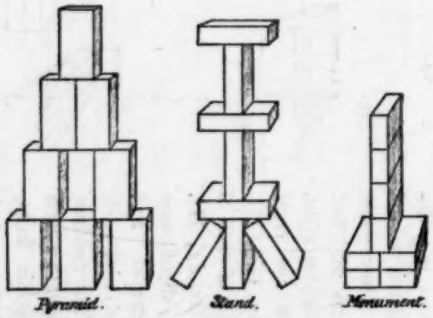
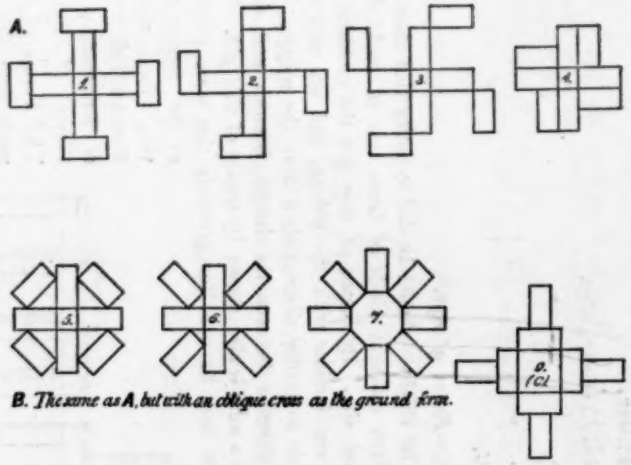


Plate VII.



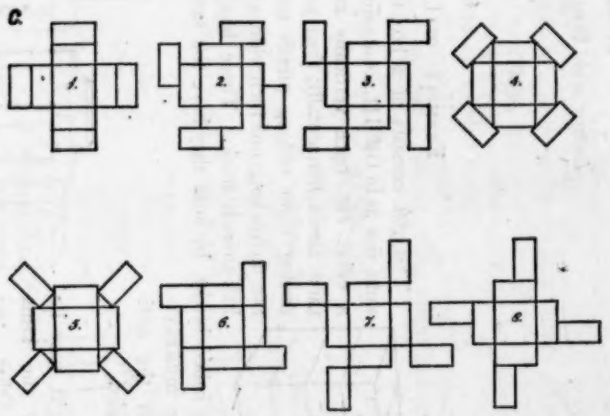


Plate VIII.

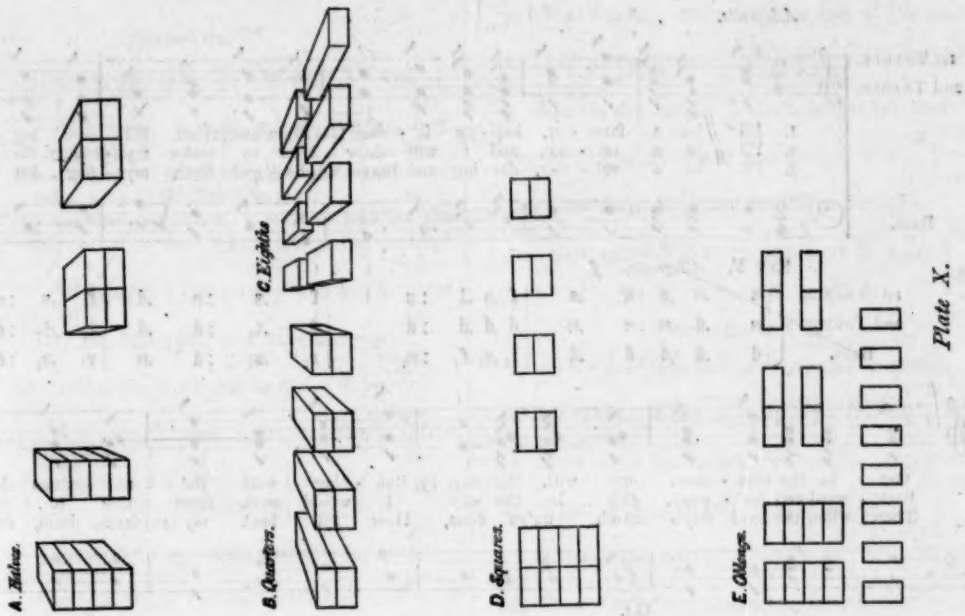


Plate X.

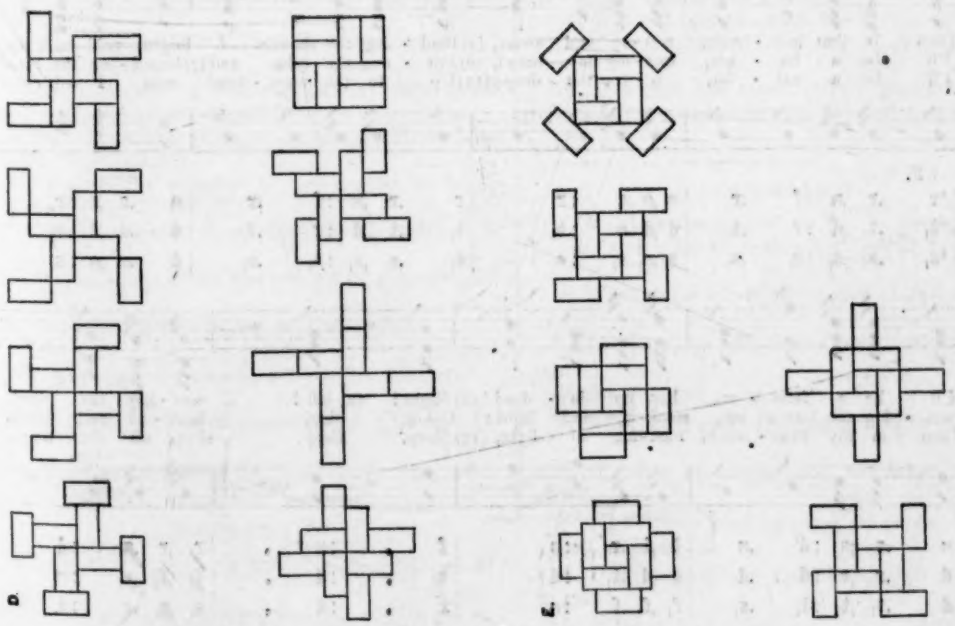


Plate IX.

THE WORKERS.

Allegretto.
1st TREBLE.
2nd TREBLE.
BASS.
1. I'll be a farm - er, hap - py in - deed! (1) Right and (2) left I'll sow my seed;
2. I'll be a tai - lor, and I will show How to make my (5) nee - dle go;
3. I'll be a sol - dier, dar - ing and brave—(9) Back and forth my flag I'll wave;
KEY F. Allegretto.
Out in the mea - dow, up with the day, (3) Rak - ing well the new - mown hay;
Back - ward and for - ward, this is the way I would work from day to day.
Then when the hard day's march we've done, How I'd beat my (10) drum, drum, drum!
C.t.
Then in the har - vest, mer - ry and sweet, (4) Bind - ing the sheaves of bright, gold - en wheat—
I'll be a ba - ker, toss - ing my bread, (6) Stir - ring the cake, and (7) knead - ing the bread;
I'll be a sai - lor, o - ver the deep; (11) Up to the mast - head soon I will creep;
f.F.
I'll be a farm - er, hap - py in - deed! (1) Right! (2) left! sow - ing the seed.
(8) Pass - ing the loaves out, smok - ing and light; Cakes, too, frost - ed and white.
Then in my ham - mock, rock - ing so light, (12) Sleep, sleep, sleep, all the night.

(1) Move hands and arms to the right and (2) left, as in sowing seed. (3) Imitate raking hay. (4) Imitate binding the sheaves. (5) Imitate stitching with the needle. (6) Imitate stirring and (7) kneading. (8) Move both arms, as if handing loaves. (9) Move hands upward, as if waving a flag. (10) Beat the drum. (11) Move hand over hand, as if climbing. (12) Imitate going to sleep: droop the head, and end slowly and softly.

Tests in Mental Arithmetic.

Standard I.

1. Add 7 and 9, and take the sum from a score. 4.

2. If a boy pays 3d. a week school money, how much does he pay in 8 weeks? 2s.

3. A woman goes to market with half-a-crown, and spends 1s. 6d.; how much has she left? 1s.

4. A boy went to a shop with a shilling, and bought 2 lbs. of sugar at 2½d. a lb. What change did he get? 7d.

5. If he had bought 2 lbs. more, how much would he have had left? 2d.

6. Add 3d., 4d., and 5½d., and take away 9d. 3½d.

7. How much more is wanted to make sixpence? 2½d.

8. I had a crown changed into sixpences. How many did I get? 10.

9. How many tens are there in 5 times 6? 3.

10. What is the cost of 3 slates at 2½d. each? 7½d.

11. How many farthings could you get for that? 30.

12. If there are three rows of potatoes, and 30 in each row, how many are there altogether? 90.

Standard II.

1. How many weeks are there in half a year? 26.

2. If a boy save a penny a week, how much would he save in that time? 2s. 2d.

3. How many days are there in September? 30.

4. If a boy spend a halfpenny a day, how much would he spend in that month? 1s. 3d.

5. How many lbs. of sugar at 3d. could he have bought for that sum? 5.

6. What is the number of half-crowns in half-a-sovereign? 4.

7. What is the cost of 4 hats at 3s. 6d. each? 14s.

8. What change would you get out of a sovereign? 6s.

9. What would 6 cows cost at £20 each? £120.

10. How many dozen are there in that number? 10.

11. What is the cost of 10 oranges at 2 for 1½d.? 7½d.

12. How many could you get for 1s.? 16.

Standard III.

1. What is the cost of 8 lbs. of beef at 8d. per lb.? 5s. 4d.

2. What would 4 lbs. of mutton cost at 8½d. per lb.? 2s. 10d.

3. Divide 800 nuts equally among 16 boys; how many should each boy get? 50.

4. What would 50 nuts cost at a penny a score. 2½d.

5. How much would 90 oranges cost at 2 a penny? 3s. 9d.

6. How much would they cost at 3 a penny? 2s. 6d.

7. What would 3 dozen articles cost at ¼d. each? 9d.

8. How many dozen could you get for a florin? 8.

9. What is the cost of 8 chairs at 5s. 6d. each? £2 4s.

10. What change would you get out of a £5 note? £2 16s.

11. How many farthings are there in 4½d. + 3½d. + 2½d.? 42.

12. How many half-hours are there in a day? 48.

Standard IV.

1. Add 3 florins, 3 half-crowns, and 3 crowns. £1 8s. 6d.

2. What change out of that, after buying 8 articles at 6s. 6d. each? 9s.

3. How many sq. inches are there in 4 sq. feet? 576.

4. What would 576 caps cost at 1s. each? £28 16s.

5. What is the cost of 3 yards of ribbon at ¾d. an inch? 6s. 9d.

6. How many threepences are there in that amount? 27.

7. If a boy gets 6s. a week, how much could he earn in a year? £15 12s.

8. How many weeks would it take him to earn 4 guineas? 14.

9. If 12 men can do a piece of work in 20 days, how long would it take 3 men? 80 days.

10. If a ton cost 5s., what will 8 cwt. cost? 2s.

11. What is the rent of 4 acres at 4s. per rood? £3 4s.

12. If a man has saved £60 a year for 12 years, how much short of a thousand pounds has he? £280.

Standard V.

1. What is the cost of 10 lbs. of mutton at 10½d. per lb., and 3 lbs. of veal at 11d. per lb.? 11s. 6d.

2. What will 8 lbs. of coffee cost at 1¼d. an ounce? 13s. 4d.

3. If 1¼ lbs. of tea cost 3s. 9d., what will ½ lb. cost? 1s. 6d.

4. What would a cwt. cost? £16 16s.

5. What is the cost of 3 tons of coal at 9d. per cwt.? £2 5s.

6. If 9 lbs. of cheese cost 6s., what will 1¼ lbs. cost? 1s. 2d.

7. How much would 4 gross of penholders cost at 1s. 6d. a dozen? £3 12s.

8. If £20 gain £1 15s., how much ought £100 to gain? £8 15s.

9. What is ⅔ of £40? £26 13s. 4d.

10. Take ⅓ + ¼ from 1. $\frac{5}{12}$.

11. $\frac{5}{12}$ of a pound + $\frac{5}{6}$ of a florin. 10s.

12. What is the interest on £450 for 2 years at 3½ per cent.? £31 10s.

STANDARDS VI. AND VII.

1. Express $\frac{5}{12} + \frac{1}{4}$ as a decimal. ·6.

2. ·75 of a sovereign + ·25 of a shilling. 15s. 3d.

3. Divide £24 between two persons, giving one twice as much as the other. £16 and £8.

4. What fraction multiplied by $\frac{9}{10}$ will give $\frac{3}{5}$? $\frac{2}{3}$.

5. What decimal added to $\frac{3}{5}$ will give ·83? ·16.

6. What fraction of a crown is $\frac{1}{4}$ of a florin? $\frac{7}{10}$.

7. If I spend $\frac{7}{10}$ of half-a-crown, how much should I have left out of that coin? 1s. 7½d.

8. At what rate per cent. will £20 treble itself in 20 years? 10 per cent.

9. What principal will gain £180 in 9 years at 4 per cent.? £500.

10. What is the commission on £768 10s. at 2s. 6d. in the pound? £96 1s. 3d.

11. A horse cost £60; what must be the selling price to gain 30 per cent.? £78.

12. If it was sold for £39, what would be the loss per cent.? 35 per cent.

Iphigenia in Aulide.

ACT V—*continued.*

SCENE III.—CLYTEMNESTRA, IPHIGENIA, EURYBATE, ÆGINE, GUARDS.

Clytemnestra. Yes, I will defend her against the whole army. Cowards, you betray your oppressed queen!

Arcas. No, madam; you have but to command me: you will see us combat and die at your feet. But what can you expect of our feeble hands? Who will be able to defend you against so many enemies? It is no longer a vain people assembled in disorder; it is the whole camp blinded by a fatal zeal. No more pity. Calchas alone reigns; he alone commands; severe piety exacts her offering. The king sees himself dispossessed of his power, and himself compels us to yield to the torrent. Achilles, before whom all give way, Achilles in vain would want to oppose his courage to this storm. What will he do, madam? and who could dispel the numberless enemies ready to envelop him?

Clytemnestra. Well, let them come to prove their impious zeal upon me, and tear away the little of life that is left me! Death, and death alone will be able to break the ties by which my arms will join us both and bind us to each other. My body will sooner be severed from my soul than that I would bear. . . . Ah, my daughter!

Iphigenia. Ah, madam! under what cruel star did you bring to light the unhappy object of such a tender love? But what can you do in our present state? You have to combat both gods and men. Will you expose yourself against a furious people? Do not, in a camp in revolt against your husband, alone, in vain obstinately detaining me, perhaps shamefully dragged by the soldiers, do not offer, as the only result of a deplorable effort, a sight which in my eyes would be more cruel than death. Go: let the Greeks finish their work, and leave for ever an unhappy shore. The funeral pile that awaits me, too near these parts, would too closely dazzle your eyes with its light. And especially, if you love me with that mother's love, never reproach my death to my father.

Clytemnestra. He! by whom your heart presented to Calchas . . .

Iphigenia. To restore me to your tears what has he not attempted?

Clytemnestra. By what treachery the cruel has deceived me!

Iphigenia. He was yielding me up to the gods of whom he had received me. My death does not carry away all the fruit of your flames. You have other ties of the love that binds you. Your eyes will see me again in my brother Orestes. May he, alas! be less fatal to his mother! You hear the voice of an impatient people. Pray open me your arms for the last time, madam, and recalling your sublime virtue . . . . Eurybate, lead the victim to the altar.

SCENE IV.—CLYTEMNESTRA, ÆGINE, GUARDS.

Clytemnestra. Ah! you shall not go alone; and I do not intend . . . But all crowd before me. Traitors! satisfy your sanguinary thirst.

Ægine. Madam, where do you thus hasten? And what do you intend doing?

Clytemnestra. Alas! I consume myself in vain efforts and return into the fearful trouble which I have only just left. Shall I so often die and yet never leave this life?

Ægine. Ah! do you know the crime and who has betrayed you, madam? Do you know what an inhuman serpent Iphigenia had sheltered on her breast? Eriphyle, whom you yourself have led here, has alone revealed your flight to all the Greeks.

Clytemnestra. O monster, whom Megæra has borne, monster whom hell has cast into our arms! What! thou shalt not die! What! to punish her crime . . . But where does my grief seek a victim? What! to drown the Greeks and to sink their thousand ships. O sea, thou wilt not open some fresh abyss! What! when, driving them from the port which contains them, Aulide will have given up their criminal fleet, the winds, the same winds, so long accused, will not cover thee with her broken vessels? And thou, O sun, and thou, who, in this country, recognisest the heir and true son of Atreus—thou, who daredst not give light to the father's repast, draw back; they have shown thee that fatal way. But meanwhile, O heaven! O unfortunate mother! my daughter, crowned with odious wreaths, is offering her breast to the daggers which her father has prepared! Calchas in her blood is about to . . . Stay traitors! it is the pure blood of the god who darts the thunderbolt . . . I hear the rolling of thunder and feel the earth tremble: it is a god, an avenging god, of whom the blows resound.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Head Master of Christ Church Schools, Macclesfield, Co-author of 'Our Mother Tongue.'

GENERAL REMARKS.

1. *Monday, the 30th September is the last day for notifying to Education Department the teacher's wish to sit at the Christmas Certificate Examination.*

[We called attention to this last month, but its importance justifies the repetition.]

On p. 16, of Form 9, the words '*Christmas Examination*' should be written after the name of any teacher who desires to attend the next Examination for Certificates.

Our candidates should therefore duly apprise the head-teachers of the schools of their intentions.

2. Our Routines have been considerably altered this month (following last year's method) in order to cover various second-rate points hitherto omitted.

3. From numerous communications received both from Training College students and from Acting Teachers, we judge that in '*English*' there is a tendency to neglect '*Bacon*,' on account of his solidity. We would earnestly warn our readers against this weakness.

4. Teachers wishing to obtain 'Blackboard Drawing' should at once make arrangements for their Exam.

5. The *Model Answers* given in our last issue should be carefully studied.

6. We would direct especial notice to Mr. Gladstone's account of 'THE CABINET,' given on p. 291 of number for August, 1888.

MACBETH.

1. In many modern editions of Shakespere's works the play of *Macbeth* is classed along with the *historical* ones, such as *King John*, *Richard III.*, and *Henry VIII.* This classification betrays, however, a gross misconception of the character of this great drama. The aim of Macbeth is not to excite an historical, but a tragical and poetical interest. If in some of the confessedly historical plays, a tragical element is introduced, it is but incidental and subordinate; but in Macbeth the reverse takes place, and history is but the vehicle employed to convey poetical tragedy.

We might with equal judgment and accuracy style *Julius Cæsar*, *Lear* and *Hamlet historical* dramas, or even perhaps—for who can tell where History ends?—*Romeo and Juliet*.

Undoubtedly the aim, the essence, the development and the culmination of this play are not historical but tragical, for even the joy aroused by the deserved fate of Macbeth is tempered by the death of young Siward, slain by the assassin usurper himself.

2. *Synopsis of Act I.*

Scene I. opens by showing three witches meeting in a desert place in the midst of a thunderstorm.

Scene II. (probably not Shakesperian) discloses Duncan and his retinue in the camp at Forres. To him enter, first a 'bleeding' sergeant from Macbeth's (the thane of Glamis) army, and afterwards the 'worthy thane of Rosse.' The first relates Macbeth's slaughter of Macdonwald, and the progress of the fight against 'Sweno' of Norway, assisted by the rebellious thane of Cawdor [*there is here a discrepancy as compared with the particulars of the subsequent narrative* in Scenes III. and IV.], whilst the loyal thane arriving completes the account of the final victory. Hereupon Duncan declares his intention of giving Macbeth the rebel thane's title.

Scene III. A heath near Forres, where the witches, whilst awaiting Macbeth and Banquo, discuss their schemes of vengeance against a sailor, whose wife has refused to share her chestnuts with one of them. When the heroes arrive, Macbeth is hailed by the first witch, '*thane of Glamis*' (his actual title), by the second, '*thane of Cawdor*' (the title about to be bestowed), and by the third, 'KING.'

At Banquo's request they foretell the royal destiny of that warrior's descendants.

After the '*evanishment*' of the witches Rosse and Angus come, announcing to Macbeth the conferring by the king of the witch-foretold title, '*thane of Cawdor*.'

This speedy fulfilment of a portion sends him into an ecstacy of musing respecting the completion of the prophecies.

Scene IV. describes the execution of the former thane of Cawdor, the meeting of Duncan and Macbeth, and the creation of Malcolm as 'Prince of Cumberland.' In Macbeth this develops a traitorous desire to hasten the accomplishment of the infernal predictions, but he departs, ostensibly to prepare for the king's reception at his castle of Inverness.

Scene V. first introduces us to Lady Macbeth at Inverness, who soliloquises whilst reading a letter from her husband, detailing his encounter with the witches and the realisation of the first promised dignity. Darkly brooding thereon, she is informed by a messenger of the king's intended visit, and of Macbeth's pre-arrival.

The latter is then urged by his wife to 'dispose-of' Duncan.

Scene VI. Duncan arrives at the castle of Inverness and receives a perfidious welcome from its mistress.

Scene VII. Macbeth, gauging the infamy, and weighing the consequences, hesitates to slay his kingly guest and benefactor, and on the appearance of his wife declares that he has abandoned his wicked design.

She, however, taunts him with cowardice, plans the accomplishment of the deed, demonstrates its facility, and finally persuades him to its execution.

3. The student should—

(*a*) Compile a summary of the remainder of the play.

(*b*) Collect a list of discrepancies and anachronisms.

(*c*) Compare Middleton's play and Hollinshed's account with our drama, and

(*d*) Be prepared to discusss 'whether this play is a "*collaboration*" or no.'

PARAPHRASING.

(*Lines* 60—75, *Act V., Scene* 8.)

No considerable period shall elapse before we reward each of you according to his loyal service, and thus discharge our debt. We will promote our thanes to a dignity new in this country—that of '*earl*.'

Anything else that has to be done, suitable to the new conditions of the realm, such as recalling to Scotland our banished friends, who departed to elude Macbeth's crafty vigilance; bringing to justice the barbarous agents of that deceased assassin and his devilish wife (who, it is said, committed suicide); and, in short, righting all things demanding rectification, shall be, by God's favour, duly accomplished in all moderation, and on proper occasions.

(*Gray's Elegy, lines* 45—60.)

It may be, that in this uncared-for graveyard is buried some person whose soul was full of poetic fervour, or perchance someone who would worthily have wielded the sceptre, or have been so skilled in music that the manipulated instrument would almost have appeared animated.

But the incipient poet, statesman and musician had no opportunity of entering upon their heritage of learning; their worthy aspirations were checked, and their minds' generous enthusiasm crushed by the weight of poverty.

Thus, among the gloomy depths and caverns of the sea lie hidden many precious stones of the purest lustre; and in the lonely wilderness where there are none to appreciate their beauty, blossom numberless flowers, ETC.

(*Bacon's Essays, No. X.*)

Love, by affording material for the plots of tragedies and comedies, has much contributed to dramatic success, but it has retarded the real progress of humanity, working much harm by its allurements and its revengeful excesses.

It is worthy of notice that everybody renowned for eminence or virtue, whether in olden or modern times, has kept Love in due subordination.

From this fact we learn, that the strength requisite for noble purpose or high office is incompatible with the feebleness of amorous desire.

Mark Antony, however, who ruled a moiety of the Roman Empire, and the Decemvir and legislator, Appius Claudius, furnish opposite instances, ETC.

ANSWERS TO ARITHMETIC QUESTIONS (Given last month).

(1) £675 15s. 6d.
(2) 5 hrs., 10$\frac{8}{11}$ mins.
(3) £32,000.
(4) 2,740 yards; 13$\frac{33}{88}$ miles per hour.

EXAMINATION PAPER IN EUCLID.

(Not more than EIGHT questions may be answered. The time taken should not exceed THREE hours.)

N.B.—*Capital* letters (excluding *A*, *B*, *C*, *D*, *E*, *F*), not numbers, must be used in the diagrams. All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as −, +, ×, PQ^2, PQ·RS, etc.

See the list of recognised abbreviations given on p. 206 of the July number.

Special credit will be given for the solution of the 'Exercises.'

I. The opposite sides and angles of a parallelogram are equal to one another, and the diameter bisects it, that is, divides it into two equal parts.

The difference between two sides of a triangle is less than the third side.

II. If two triangles have two sides of the one respectively equal to two sides of the other, but the angle contained by the two sides of the one greater than the angle contained by the two sides equal to them of the other, then the base of the triangle having the greater angle shall be greater than the base of the other.

In the construction, why is the restriction introduced 'let one side be not greater than the other'?

III. Divide a straight line into two parts, so that the rectangle contained by the whole and one of the parts shall be equal to the square on the other part.

Show that the sum of the squares on the sides of a triangle is double the sum of the squares on half the base and the mediant.

N.B.—The mediant, or median line, is the line joining the vertex to the bisection of the base.

IV. If a straight line drawn through the centre of a circle bisect a straight line in it which does not pass through the centre, it cuts it at right angles.

A point is fixed in the circumference of any circle. Then the sum of the squares upon the lines drawn to the extremities of any diameter is constant.

V. If a straight line touch a circle, the straight line drawn from the centre to the point of contact shall be perpendicular to the line touching the circle.

The straight lines joining the extremities of parallel chords in a circle are equal.

VI. The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles.

Prove also the converse of this proposition.

VII. The angle at the centre of a circle is double the angle at the circumference, *i.e.*, on the same arc.

Prove that if two circles intersect each other, the common chord bisects the common tangent.

VIII. In a given circle inscribe a triangle equi-angular to a given triangle.

If a quadrilateral be described around a circle show that the sum of one pair of opposite sides is equal to the sum of the other pair.

IX. Construct an isosceles triangle having each of the base angles double the vertical angle.

Squares are circumscribed and inscribed around and within a given circle.

Compare their areas.

X. If a straight line be drawn parallel to one of the sides of a triangle, it shall cut the other sides, or these produced, proportionally.

ABC is a triangle having the side AC greater than the side BC. From AC a part DC is cut off equal to BC, and DB is joined. Show that DB does not bisect the angle ABC.

XI. Show how to inscribe a square in any triangle, OR prove that the diagonal and side of a square have no common measure.

SCHOOL MANAGEMENT.

Short Notes on Reasoning.

To reason is to combine generally two or more judgments, so as to arrive at a new and, perhaps, further advanced result.

Reasoning may be broadly stated to be either *Inductive* or *Deductive.*

INDUCTIVE REASONING is the building-up of a general conclusion from the accumulation of particular instances.

It is founded upon the belief that 'similar causes always produce similar results,' in short, upon the constancy of Nature.

The formal enunciation of the elementary principles of Inductive Reasoning is older than the Greeks, but the credit of their scientific elaboration is due to Bacon.

DEDUCTIVE REASONING is the converse of Inductive, and is the culling of a particular conclusion arrived at through being contained in a general statement.

Syllogism is reasoning of either kind with all its steps fully stated.

An Inductive Syllogism (from particular to general).
1st Statement. The sun has risen every morning (*accumulation of instances*) for thousands of years.
2nd Statement (generally not expressed).
There has been no alteration in nature.

GENERAL *Conclusion.* Therefore it will rise every morning.

A Deductive Syllogism (from general to particular).
1st Statement. All men are mortal.
2nd Statement. I am a man.

PARTICULAR CONCLUSION. Therefore I am mortal.

'HYPOTHESIS' has two meanings.
1st. Things taken for granted = Premises.
2nd. A theory invented to account for certain phenomena.

AN INFERENCE is a result of reasoning arrived at without going through the intermediate syllogistic steps, *e.g.*,—

'The savages killed my brother,'
'Therefore they would probably kill me.'

The omitted statement would be somewhat as follows:—
'They would kill all such persons.'

ROUTINE FOR OCTOBER (MALES) *(CONSIDERABLY ALTERED)*.

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	The vital points of the Code. Articles 3, 11, 12, 13, 15, 82, 83, 89, 90, 92, 94, 104, 106 to 111. The different Circulars, *See Heller's Code.*	Euclid — Book III.	Paraphrase Lines 60—75 Act V., Scene 8, of Macbeth	Euclid Deductions — Any on Book III.	Paraphrase Lines 45—60 of Gray's 'Elegy'	The climates of our important 'Possessions' How is our trade thereby affected?	*Revise* the text of Gray with notes	Map of Italy	Grammar Answer mentally the Questions in *Hewitt and Beach's 'Mother Tongue,'* pp. 236, 237, 254 (4th Ed.); or pp. 190, 207 (Old Ed.)	Fish and Marine Animals of the various Zones	Euclid — Book VI., to Prop. 17	*Revise* Bacon *or* Paraphrasing
TUESDAY	*Revise Mr. Cowham's* Geographical Papers in *Practical Teacher*, 1888	The Proofs of the Methods of Binomial Expansion	Music — Terms and signs in common use relating to 1. Expression, 2. Pace, and 3. Style	*Revise* Any Arithmetic and study our remarks upon the Examination Questions	History — Lives of Great Men	Draw up a course of ten lessons for the first stage of any 'Specific'	Euclid Deductions — Any on Book VI.	*Revise* Dates and Dynasties	Practise miscellaneous examples in Algebra	Disinfectants	Work the Deductions given in our Article	Outlines of History from 1327 to 1422
WEDNESDAY	Surds	Study the points of 'Reasoning' mentioned in our Article	Euclid Deductions — Any on Book III.	Proofs of the elementary processes of Algebra	Euclid. — Book VI. to Prop. 17	*Music.*—Terms in common use relating to 1. Expression 2. Pace, and 3. Style, *or* Practise Transposition and Transcription	The Binomial Theorem	Outlines of History from 1154 to 1216	Paraphrase 'The stage is more beholding to Love . . . . . if watch be not well kept.' Bacon's Es., No. X.	Euclid Deductions — Any on Books III. or IV.	*Study Mr. Kinton's Article on Macbeth*	Map of Switzerland
THURSDAY	Write 20 lines of Composition upon 'To give moderate liberty for griefs and discontentments to evaporate is a safe way'	Write twelve lines of the *small-hand* copy 'The Pilgrim's Progress affords the best illustration' and of the *Large-hand* copy 'Phrygian Garments'	Euclid — Book IV.	General Geography of Russia	Exercises on Permutations and Combinations or Arithmetic	*Revise* History. Lives of eminent men	*Revise Mr. Cowham's* Geographical Papers in *Practical Teacher*, 1888	Euclid — Book IV.	Why should a teacher of the young study 'Mental and Moral Philosophy' and 'Animal Physiology?'	Permutations and Combinations	*Revise* Bacon	Important Dates to end of William IV.
FRIDAY	Study our remarks on Gray in the September No.	General Geography of Russia	G.C.M. and L.C.M. of Algebra with *Proofs*	Simultaneous Simple Equations	*Mr. Cowham's* Article on Locke in our September issue	Euclid Deductions — Any on Book IV.	*Music.*—The voices of men, women and children	Outlines of History from 1216 to 1327	The three Progressions	The common errors perpetrated in ordinary Notes of Lessons	Music — General Rules relating to Voice Training	*Revise* Notes of Macbeth to end of the Play
SATURDAY	Important Dates to end of George III.	Notes of Macbeth to end of Play	Work the exercises on the Binomial Theorem given in our Article	Music — 1. Major and Minor Scales 2. Intervals 3 Transposition — 1. Modes 2. Intervals 3. Bridge Notes and Removes	*Revise* the text of Bacon with notes	'Form VIII. M.' Examination, Duplicate and Exception Schedules	Euclid — Book III.	*Revise* any Dates — Progress of Parliamentary Reform	General Geography of the Balkan Peninsula	Euclid Deductions — Any on Books I. or II.	Read our Article in the September issue	*Mr. Kinton's Article* on Macbeth in the September number

Revise Any Geography	Logarithms and Interest	*Mr. Cowham's Article* on Locke in our September number	Repetition *or* Music

ROUTINE FOR OCTOBER (FEMALES) *(CONSIDERABLY ALTERED).*

DAY	FIRST WEEK			SECOND WEEK				THIRD WEEK			FOURTH WEEK			
MONDAY	The vital points of the Code Articles 3, 11, 12, 13, 15, 82, 83, 89, 90, 92, 94, 104, 106—111. The various Circulars *See Heller's Code*	Music — The Compass and Register of the Voice — Voice Training	Paraphrase Lines 60—75 Act V. Scene 8 of Macbeth	*Revise* from Text Book 'Household Expenses'	Paraphrase Lines 1—13 Act I. Scene 5 of Macbeth	Geography of our North American Possessions		Analyse and Parse difficult words of Macbeth Act III. Scene 6 Lines 26—49	Draw maps of New Zealand and British South Africa	Grammar Answer mentally the Questions in *Hewitt and Beach's 'Mother Tongue'* pp. 236, 237, 254 (4th Edn.) or pp. 190,207 (Old Edn.)	Geography of the British Isles	Explain, using diagrams, the importance in a system of Draining of 1. Trapping 2. Disconnection 3. Ventilation	Study carefully Bacon's Essays XXII. to XXVI. inclusive	
TUESDAY	Geography of our European Possessions	Stocks	Music — Terms and Signs in common use relating to 1. Expression 2. Pace, and 3. Style	Percentages	Summarise Constitutional Progress during the Stuart Period	Answer the given Music Questions		Music — Time *See Dunstan's Manual* pp. 24—36, and 56—58	History — 1. Commerce of the Stuart Period 2. Contemporary events of the Stuart Period	Work any Problems in Stocks	Any Needlework	Repeating Decimals 1. Square Root 2. There cannot be as many figures in a repeating decimal as the denominator of its vulgar fraction represents	*Revise* Outlines of the Stuart Period to 1688	
WEDNESDAY	Practise Needlework Diagrams	Study the points of Reasoning given in our Analysis, April, 1888	Describe fully the process of Bread-making. What chemical changes take place?	Draw maps of Burmah and Hudson's Bay	*Revise* Food in common use from Text Book	Music Terms and signs in common use relating to 1. Expression, 2. Pace, and 3. Style *or Practice* Transposition and Transcription		Study the Theory of Fractions and Proportion	Lives of Great Men *or* Dates	Lives of Great Men *or* Dates	Disinfectants	Study carefully Bacon's Essays	Geography of New Zealand	
THURSDAY	Write 20 lines of Composition upon 'To give moderate liberty for discontents and griefs to evaporate is a safe way'	Study the elementary strokes of which manuscript writing is composed	Pay special attention to 'Button-Holing'	Draw sketch maps of British Guiana and the Fiji Isles	Discount	History — 1. Abolition of Feudal Incidents 2. The National Debt 3. Relation with Holland during Stuart Period		Geography of our South American Possessions	Describe the best means of 1. Preparing, 2. Boiling, and 3. Serving up a Dish of Potatoes What is their value as an article of diet?	Why should a teacher of the young study Mental and Moral Philosophy and Animal Physiology? In answering analyse the human constitution	Complex Fractions and Compound Proportion with inverse ratios	The Parliaments of the Stuart Period	*Study Mr. Kinton's Article on Macbeth*	
FRIDAY	Revise any backward subject	Maps of Canada and India	Arithmetic. — Insurance	Revise any backward subject	*Mr. Cowham's Article on Locke in our September issue*	Practise Plain Sewing		Music — The voices of men, women, and children	Study the text of Bacon	*Revise* Simple and Compound Interest	Notes of a Lesson on *'Mental Arithmetic'* to Standard II.	Music — General Rules relating to 'Voice Training'	Arithmetic — Problems on Cubical Contents or Papering of Rooms (etc.)	
SATURDAY	Dates of Commonwealth and Charles II.	Analyse and Parse difficult words of Macbeth Act IV. Scene 1 Lines 50—86	Geography of Canada	Music 1. Major and Minor Scales 2. Intervals 3. Transposition — 1. Modes 2. Intervals 3. Bridge Notes and Removes	Carefully read Bacon's Essays XXI.—XXIII. inclusve	1. Form VIII. M. 2. Examination 3. Half-time and 4. Exception Schedules	Reign of James II. — (Ross pp. 300—314 and Cox 411—424)	Problems in Square Root	Geography of Australia	Practise Plain Sewing	*Study our Article in the September issue*	*Mr. Kinton's Article on Macbeth in 'Practical Teacher' for September*	Geography of our Oceanic Possessions	Facilities afforded by Post Office for Saving. *See our September Article*	*Mr. Cowham's Article on Locke in our last issue*	*Revise* any backward subject

FEMALES.

PARAPHRASING.

(*Lines* 1—13, *Act I.*, *Scene* 5, *Macbeth.*)

I encountered the women when all things appeared favourable; and from accurate intelligence, I know that they possess supernatural information. They, however, evaded my further inquiries (ardently as I wished to make them) by melting into thin air and becoming invisible.

At this moment, I, amazed at the prodigy, received letters from my sovereign conferring upon me the title 'Thane of Cawdor,' by which address the witches had previously accosted me, before that they had named me as future king, ETC.

PARSING.

(*Lines* 50—86, *Act IV.*, *Scene* 1, *Macbeth.*)

(1) *Which, howe'er, answer, though, up, blown, till, rather, farrow, high, thyself, beware, than, to, scorn, what, double, may tell, like.*

(*Lines* 26—49, *Act III.*, *Scene* 6, *Macbeth.*)

(2) *Lives, thither, is gone, that, free, exasperate, absolute, as, that, fly, ere accursed.*

MUSIC.

Selected Government Questions.

STAFF NOTATION.

1. Write a passage given in the treble or bass clef, in the bass or treble clef, giving the key signatures, and placing the pitch one or two octaves higher or lower (1888, 1887, 1886.)

2. Write the signatures of B major, A♭ major, D major, E minor, C♯ minor, G minor (1888); A major, E♭ major, F major, E major, F♯ minor, C minor, D minor, C♯ minor (1887); and C minor, F minor, G minor, E major, B major, D major (1886).

3. Given an octave in the natural key, by adding sharps or flats to make into the scale of F♯ minor, with a major sixth and major seventh (1888); into F minor, with minor seventh and minor sixth (1887); into B minor, with a major sixth and a major or sharp seventh (1886).

4. Write *above* certain notes other notes, to form an augmented or pluperfect fourth or tritone, a major sixth, a minor sixth, a dimished seventh, an augmented second (1887, 8).

5. What are the following intervals:—From E♭ ascending to C♯, from F to G♯ ascending, from G♭ ascending to E♭, from F♯ ascending to E♭? (1886).

6. Transposition of a passage containing numerous accidentals from E minor to G minor (1888), from A major to F major (1887), from B♭ major to G major (1886).

7. Write out note-tests for Division IV. in Schools (1888 and '7).

8. Write out the melody of 'God save the Queen' (1888) in the Key of F with a minim for a beat or pulse, (1887) in the Key of A with a crotchet for a beat or pulse.

9. Compose time-tests for Division IV. in School (1888).

10. Transcribe a passage given in $\frac{4}{4}$ into $\frac{3}{2}$ time (1888, '7 and '6).

11. Shew the compass of Alto and Treble voices of boys and girls from eight to ten years of age (1888 and '7).

12. What objections are there to making all boys sing alto and all girls sing treble? (1888).

13. Describe a good voice-exercise calculated to improve quality and sweetness of tone. Enumerate some bad habits of children's singing (1886).

14. Various questions on syncopation.

15. If you were an adjudicator at a competition of school choirs, under what heads would you give marks?

16. State the meaning of the following terms—*Unison, Largo, Forte, Presto, Dolce, Da Capo, Ad Libitum,* ♩. = M. 60, ♩. = M. 100, ♩ = M. 70.

17. Give the Italian equivalents of *Gradually Slower, Very Fast, Short and Detached, Soft, With Vigour, Repeat from Beginning.*

TONIC SOL-FA.

1. The tones **d r t, d** are the relative major for **l, t, se, l,** of the minor key.

What tones in the relative major correspond to the following minor passage?

l, t d m r f m t, r l, se, r d t, l, (1888) and

What tones in the relative minor correspond to the following major passage?

d m r s f d m r f s m s, l, t, d (1887).

2. What are the names for *doh* sharp, *lah* flat, *fah* sharp? (1887).

What do the following names show? *de, la* (or *lau*), *ra* (*rau*), *se, ma* (*mau*), *ba* (*bay* or *bah*) (1888).

What is the name for *ray* sharp, *te* flat, *soh* sharp? (1886).

3. Write the following intervals, above *ray* an augmented (pluperfect) fourth or tritone, above *te* a diminished seventh, above *doh* an augmented second (1888), above *doh* an augmented fourth, above *me* a major sixth, above *doh* a minor sixth (1887).

Write against each of the following intervals its name:—*ma* to *de*', *fah* to *se*, *ta* to *soh*', and *fe* to *ma*' (1886).

4. Re-write the following on *the imperfect method* (*i.e.*, without change of key)—

m s d r m 'r t, d s, 'm f r d t, d (1888).

Re-write the following in the *first sharp* key (regard the first note as *ray* and so on)—

l fe r s fe d' t l s fe m re m (1887).

Re-write the following in the *first flat* key (regard the first note as *ray* and so on)—

s ta l m s f de r m ta l s f (1886).

5. Re-write a given passage, doubling (or halving, or thirding) the value of each note or rest (1886, '7 and '8).

6. Write, beginning on the strong accent, a four-pulse, a six-pulse, a three-pulse and a nine-pulse measure (1888).

Specimens of four-pulse, two-pulse and three-pulse measures, beginning on medium, weak and strong accents are given for identification (1887).

7. Similar questions to *Nos.* 7, 8, 9, 11, 12, 13, 14, 15, 16, 17 of the Staff Notation were also given in 1888, '7, '6.

CORRESPONDENCE.

We shall be pleased to reply briefly and through this column to any seeking information and advice. Communications, if sent to the Publishers, should be addressed 'CERTIFICATE EDITOR.'

Answers demanding urgency will be promptly forwarded per post on receipt of a stamped and directed envelope. A post may be saved by addressing direct to Macclesfield.

Any suggestion tending to the greater utility and interest of these articles, or to the greater convenience of either 'COACH' *or* PUPIL, *will be thankfully received and carefully considered.*

CERTIFICATE (Garndiffaith).—There are thousands of half-time girls in the kingdom. For answers to queries (2) and (3) please forward stamped and directed envelope, and they shall be answered more fully per letter than space would here allow.

M. N. (Malvern).—You will find the required information on p. 414 Cox, or p. 306 Ross.

HAON (Sunderland).—Acting-Teacher taking 2nd Year Papers for the first time cannot attempt Political Economy. By all means try this year; the new regulations of 1890 may prevent you next year.

H. G. (Swansea), F. W. (Birmingham), C. O. (Brighton), A. M. (Amesbury), L. de F. (Launceston), and F. W. (Lakenham), answered per ordinary letter.

(To be continued.)

Shakspere's 'Macbeth.'

BY J. L. KINTON, B.A.,

Late Lecturer on English Literature at the Westminster Training College.

IX.

[For the sake of economising the space available for these articles, we find it necessary to omit the text, and give only the annotations and commentary.]

ACT III.

SCENE 1. *Forres. The Palace.*

Some undefined time has now passed since Duncan's death, and Macbeth is in undisputed possession of the throne. According to Holinshed's Chronicle, he had reigned ten years with 'a counterfayte zeale of equitie' in order to 'purchase thereby the favours of the people,' but at length 'he beganne to shewe what he was, in steede of equitie practising crueltie,' etc., the first of his tyrannical deeds being the assassination of Banquo. In the play, however, the incidents of this Act evidently follow those of the preceding without any such interval of time. (See l. 28: 'We hear our bloody cousins are bestowed in England and in Ireland'; and Banquo's opening speech, 'Thou hast it now,' which would appear unsuitable if any considerable time had elapsed.) Such disregard of chronology is common in dramas and historical romances. (See Shakspere's Richard I., or King John, and Sir Walter Scott's Woodstock.) The writers represent events, as has been said, *without perspective*, the artistic effect being increased by the grouping of those events in immediate sequence of time, which are still more closely related as cause and effect. Shakspere also, with the same dramatic purpose, omits the somewhat improbable '*equal justice*' exercised by Macbeth for ten years according to the historian, and thus is enabled to work out his idea of the character more consistently and harmoniously. The first Act of this drama represents the incidents leading up to the death of Duncan; the second Act, the assassination and its attendant circumstances; the Act before us is devoted almost exclusively to the fate of Banquo, and he therefore very appropriately opens the first scene. His soliloquy (1-10) and that of Macbeth (48-71) and their intermediate dialogue reveal the present sentiments and the mutual suspicions of the two men, and prepare the way for the development of the villainous design of the latter. Banquo appears to be on a visit at the court.

1.—The pronoun *it* stands for *the Kingdom* here and in line 3 (for '*t*).

2.—*The weird women.* These are supernatural beings called *women* in reference to their appearance, also *the weird sisters* elsewhere.

3.—*Thou play'dst most foully for 't.* A metaphor from gambling = Thou didst gain it by the most dishonest means. *It was said* (by the sisters). *It* is in apposition to the noun sentence in line 4.

4.—The prediction corresponds not to the passages in the play, but to the form in Holinsheds: 'Neither shall he leave any issue behind him to succeed in his place; . . . but of thee those shall be born which shall govern by long order of continual descent;' and Macbeth would (afterwards) call Banquo the *father of many kings*.' *It should not stand*, the kingdom should not remain.

5, 6.—*Them*, the witches. *As upon thee, their speeches shine*, as their promises have been so clearly fulfilled with respect to you.

7.—*Verities*, true predictions.

8.—*Why may they not be my oracles?* Why may I not consider their promises to me as Divine assurances? The 'oracle' was the response of a deity to inquiries as to the future; or the temple where it was given, as that at Delphi.

11.—*Our chief guest*, a hypocritical compliment.

12.—*It had been*, it would have been (subjunctive mood).

13.—*And all-thing unbecoming*, and (it would have been) altogether improper. *All-thing* is adverbial (of degree), like '*nothing* afeard,' i. 3, 96.

14.—*A solemn supper*, a public state supper. (Lat. *sollennis*; from *sollus*, whole; *annus*, year; literally *annual*, hence established, stated, formal.)

16.—*Command upon me* (rather than 'request'). 'Command' is used for 'lay (your) command,' otherwise the preposition would seem to be superfluous. *The which.* The article is used with the relative only when the latter introduces a clause which does not limit, but adds some additional fact to the antecedent. Here the antecedent is the noun involved in the verb 'command': '*My duties are knit to*' your command, *i.e.*, I am bound to obey you.

18.—*Knit* (for *knitted*) allied to *knot*, and is nearly synonymous with *tied*.

Macbeth, in order that he may arrange his scheme of assassination, inquiries of his guest whether he rides 'this afternoon,' referring either to a general practice of Banquo (see 3, 12), or to some special intention of which he has received information. He is determined there shall be no mistake, 'no rub in the work.' He then apologises for his inquiry by pretending that he should have held a council in the afternoon, but that he will now postpone it till to-morrow, so as to have the benefit of Banquo's 'good advice.'

21.—*Desired*, requested. *Still*, ever, invariably. *Grave*, full of *weight*, important. (Lat. *gravis*, heavy.) *Prosperous*, leading to success.

22.—*Take to-morrow* (for it).

23.—*Is't far* (that) *you ride?* Having ascertained that Banquo will certainly go, he now wishes to know whether his ride will be a long one, again apologising for his inquiry by pretended anxiety that he may return in time for the 'feast,' the solemn supper.'

25.—*Go not my horse the better . . . . the night.* (If) my horse go not the better (of the two), *i.e.*, faster than the coming on of night. (Abbott.) Or 'the' may be taken as adverbial, *i.e.*, *the better* = by that (consideration), viz., that night is approaching. The construction is peculiar.

27.—*A dark hour*, an hour's ride in the dark.
Fail not (to be present at) *our feast.*

29.—*Are bestowed.* Passive, but the verb is also used reflexively: like (6, 24) 'he bestows himself.' *Bestow* has now the sense of *give*, but originally, as here, it had the literal force of *to place, to settle*, like the simple verb *stow*.

30.—Malcolm fled to England, and Donalbain to Ireland.

31.—*Their hearers*, those who will listen to them.

32.—*Strange inventions*, remarkable stories which they have invented. *Of that* (we will speak) *to-morrow.*

33.—*Therewithal*, in addition to that. *Cause of state*, state matters.

34.—*Craving us jointly*, demanding our united consideration. *Hie you*, hasten. *You* is here the objective reflective; *cf.* 'Hie thee' (i. 5, 23). And we may again refer to the Tudor usage as to the second personal pronoun. In this scene Banquo addresses the King *respectfully* as '*you*' (plural), and Macbeth addresses his subject *courteously* in the same manner. But in the soliloquy Banquo apostrophises the King with the more *familiar* (or *less respectful*) '*thou*' and '*thee*' (1-10). So the King, in the concluding couplet, 'Banquo, *thy* soul's flight,' etc. To the attendant Macbeth appears to speak with mock civility, '*Sirrah*, a word with *you*' (44). [*Cf.* 'And *you, sir:*' Jul. Cæsar 1, 1.] In the

interview with the two murderers (73-139) the King directs his discourse throughout to both; hence the 'you and your' are true plurals. In scene ii. Macbeth speaks to his wife both *affectionately* ('*thou*,' 37, 40, etc.) and *courteously* ('*you*, 29; *your*, 30). And Lady Macbeth uses the *respectful* form throughout in addressing her husband (viii. 28, 35); *cf.* i. 5, 'Glamis, *thou* art,' etc.

35.—*Goes Fleance with you?* It is part of Macbeth's plot that Banquo's son shall 'embrace the fate of that dark hour' (136) with his father. Hence the inquiry.

36.—*Our time does call upon's*, it is time for us to start.

38.—*Commend you to their backs;* 'hope you may have a pleasant ride.' A jocose play upon the word *commend*.

40.—Every one is at liberty to spend the time as he pleases.

41.—(In order) *to make the sweeter welcome* (to) *society*.

43.—*While then*, till that time. *While*, usually an adverb conjunction, is here a preposition, with the sense of '*up to*.' This form seems to have been a colloquial Northern idiom, and is now only a provincial vulgarism.

44.—*Sirrah* is a lengthened form of *sir*, used generally to inferiors, or contemptuously. *Attend those men our pleasure?* Are the men I spoke of waiting till I am prepared to meet them? Macbeth had got rid of his guests for a time that he might be at liberty to hold the interview for which he had arranged with the two hired assassins.

47.—Construe: *To be thus (as I am), without being safely thus*, is nothing, *i.e.*, worthless.

49.—*His royalty of nature*, his noble, king-like disposition.

50.—*Which would be feared*, which *requires*, *demands* to be feared. An O. E. use of the auxiliary.

51.—*To that..he hath*, etc.; he has..besides that.

53.—*But he.* We should now say, '*but him*,' using *but* as a preposition. In Tudor English, *but* in such phrases is to be considered as a conjunction, no (other) *than* he.

54.—*Being*, existence. 'He is the only living man of whom I am afraid.' *Under him*, under his influence, when he is near.

55.—*My Genius.* According to the Romans, the Genius was a spirit that presided over the *birth* [*gigno*, *genitus*, to be born] and life of an individual, somewhat corresponding to the 'guardian angel' of Jewish and Christian belief. The reference to Cæsar and Antony is more fully given by Shakspere in his Antony and Cleopatra ii. 3, 20-30, where, instead of *genius*, the parallel Greek term *demon* is used ('Thy demon, that's thy spirit which keeps thee'), and also '*angel*.' The story is originally found in the Roman writer Plutarch.

57—*Chid:* the older form is *chode*. Macbeth's jealousy makes him unjust. Banquo did not *chide* the sisters. (See i. 3, 52-60.)

58.—*Prophet-like they hail'd him*: they prophetically saluted him. *Prophet-like* refers to the weird sisters.

60-61.—*Fruitless*, *barren*, the possession of which will terminate in myself, and therefore comparatively worthless.

61-62.—*Gripe* and *wrench* are very effective metaphors. All his desires to hand on his power in his own line will be utterly useless, as fate has decreed that Banquo's issue shall succeed. *With an unlineal hand*, by one who is not in the *line* of descent from me.

64.—*Issue*, offspring (properly a participle, from the O. F. *issir*, *issu* [Lat. *exire*], to go out): *cf.* F. *tisser* (tissue), from L. *texere*, to weave. *Filed*, polluted (A.S *fylan*, from *ful*, foul). This verb corresponds in meaning to *defiled*, but the latter is of a different origin.

65.—*Gracious*, good, worthy: perhaps also kindly, 'meek.

66.—*Rancour* seems to be used here in the literal sense of *rancidity*, that which is *rancid*, sour, 'bad.' Paraphrase, 'I have put bitterness in the cup of my peace': I have embittered my peace of mind.

67.—*Mine eternal jewel*, my everlasting treasure, my soul.

68.—*The common enemy of man*, the enemy of all mankind, Satan. Observe how Shakspere avoids using ordinary religious terms when he represents his characters as speaking religiously.

70.—*Rather than* (it shall be) *so*, *come*, *fate*, etc. He declares his determination to struggle against fate, regardless of all consequences. The figure is taken from the tournament. The '*list*' is the enclosed space (generally *lists*).

Champion, fight as a champion against *me* [from *kempa*, a warrior, Scand.] *To the utterance*, a technical term in chivalry, used of fighting even to the death: 'to the *uttermost*.' But *utterance* is from French *outrance* (*outre* fr. L. *ultra*) [not from the English *utter* and *out*]. O. F. *à outrance*. The two murderers are desperate men, whom it is clear that Macbeth's 'heavy hand' has deeply injured—'bowed to the grave and beggared.' But to incite them to the murder he now declares that it was Banquo who had been their enemy, not himself, as they had thought.

77-8.—*Held you under fortune*, kept you down so that you should not attain to fortune. *Our innocent self*, I who was innocent.

79.—*Conference*, interview. *Passed in probation*, went over (all the facts) in proof.

80.—*Borne in hand*, kept in suspense. *Crossed*, thwarted.

80-1.—*The instruments* (employed) and *Who* (it was that) *wrought with them*. *Wrought* = worked: the old form.

82.—*A notion crazed*, even to a crazy mind, to an idiot. *Notion* is here used of the *thinking mind*, not the *thought*.

83.—*Went further*, *i.e.*, I showed you that you might be revenged on him.

86.—*This*, the injury you have received from him. *Go*, pass without punishment. *So gospell'd*, so filled with the forgiving principles of the Gospel (as) *to pray*, etc.

90.—*Yours*, your children. *We are men*, we have the feelings of men.

91.—*Catalogue*, a *general* list is distinguished from '*the valued file*' (94), the particular catalogue in which the objects are arranged in accordance with their *value*.

92.—*Mongrels*, hybrids, cross-breeds. So '*demi-wolves*' (93).

93.—*Shoughs* and *rugs*, both indicate *rough*, coarse-haired dogs. *Clept* = called, was a common verb in Early English and is frequently found in Tudor English, though now quite obsolete. (E. E. *clepan*, A. S. *cleþian*, to call.)

96-100.—(But) *the valued file distinguishes* (them by their qualities as) *the swift*, etc. (or by their uses), as the *housekeeper* [*i.e.*, the house-dog], the hunter, etc.

98.—*Hath in him closed*, has made his peculiar characteristic.

99.—*Particular addition*, a special term of distinction. *From the bill that writes them all alike*, *i.e.* (In a manner different) from that catalogue in which all are set down without such 'particular addition.' *Catalogue*, *file*, *bill*, are synomymous for *list*.

101.—*A station in the file . . . of manhood*, a place in the list of men (which is) *not i' the worst rank*: 'not amongst the meanest kind; *i.e.*, If you are men of spirit, not willing to suffer your wrongs to go unavenged.

103.—I will make known to you the scheme I have formed.

104.—*Whose execution*, the carrying out of which. *Takes off*, a euphemism for 'destroys.' So 'his taking off,' i. 7, 20.

105.—*Grapples*, poetical for *binds*. *Of us* instead of *our*, in antithesis with *your enemy*. The 1st pers. *pl.* is used (for 'of me' 'my') by Macbeth as King.

107.—*Which in his death were perfect*, which (health) would be perfect if he were dead.

111.—*Tugged*, mauled. The word, formerly less mean and colloquial than now, involves the idea of dragged about in a struggle. *With* = by, formerly used both of the instrument and the *agent*.

112.—*Set*, risk, a figure from gambling, 113. *On 't*, *of* it.

115-7.—*In such bloody distance*, we are so mortally estranged. *Distance* is estrangement, enmity. *Every minute of his being*, every moment that he lives. *Thrusts*, etc. Instead of Banquo himself, 'Every minute of his being' is, by a bold personification, represented as attacking Macbeth, aiming most deadly blows at *My near'st of life*, that part of me which is nearest, most intimately connected with, my life—on which my life depends, *i.e.*, my heart. In this peculiar expression '*near'st*' is in a sort of antithesis to '*distance*.'

118.—*Barefaced*, undisguised, open.

119.—*And bid my will avouch it*, assert that my mere will was a sufficient reason for his death: literally, 'Require my will to claim (or answer for) the deed.' '*Avouch*' is an old law term signifying to claim a person or thing, or to defend a cause in a court of justice.

120.—*For*, on account of, because of.

120-1.—*For certain friends . . whose loves*, etc. Macbeth represents that a desire to retain the love of these friends kept him back from a barefaced act of tyranny—but, of course, the real reason would be fear of rebellion. He will therefore have the deed done secretly, and will pretend to lament it. *Whose loves.* Abstract nouns were used in the plural in Old English more frequently than at present, especially when the name of the quality or action refers to more individuals than one, as here. *Cf.* '*Our loves*,' Hamlet i. 1, 173.

But (be-) *wail*, etc. Supply 'I must' from the previous sentence (119). From *for* to *down* is parenthetical.

His fall who, the fall of him whom. Here (1) the antecedent to the relative is a possessive, and (2) the objective termination of the relative is omitted, as is common in Tudor English.

122-3.—This is the reason why I court (seek) your help.

124.—*Masking*, poetical for 'concealing.' *The common eye*, public knowledge. Observe that even with these intending assassins Macbeth avoids direct terms in speaking of the meditated murder; he speaks of 'business,' 'work' (133), '*it*' (130), 'his fall,' 'absence,' 'the fate of that dark hour,' etc. This is a 'touch of nature.'

125.—*Sundry* is an obsolete word, except in law language; *divers* (Heb. i. 1, 'Sundry times and divers manners'). We use 'several,' which is from *sever*, as *sundry* from *sunder*. *We shall*, we will. Here 'shall' promises in the first person.

126.—*Though our lives.* Macbeth, finding that they are entirely subservient to his will, is too impatient to allow the speech to be concluded; he therefore interrupts the man with a compliment, and then arranges for a further interview within an hour, that he may give them more particular directions for doing the deed that night.

127.—*Your spirits shine through you*, your courage and determination are manifest in your countenances (or manner). *At most*, at furthest.

128-9.—*Acquaint you with the perfect spy of the time*, (I will) furnish you with information as to the exact manner in which you are to be on the *look out* at the time. This explanation makes 'spy' an abstract noun, contrary to usage; but some refer it to the third murderer (scene iii. 1-5), which cuts the knot of the difficulty, but hardly suits the context. *On 't.* *On* for *of.*

131.—*And* (it must be done) (away) *from* [*i.e.*, at a distance from] *the palace.* *Something* is adverbial (= somewhat), like 'all-thing,' l. 14, and 'nothing,' i. 3, 96. The phrase 'something from' signifies 'at some distance from.' But this does not represent the antiquated construction correctly. *Always thought*, (it being) always remembered (by you). But the following clause really takes the place of the nominative absolute, so that there is, strictly speaking, no ellipsis.

132.—*I require a clearness*, I must take no part nor be suspected of any part in it.

133.—(So as) *to leave no rubs or botches in the work*, nothing to check or mar it. *Rub* was a term used of the *hindrance* produced by the *friction* of the ground in bowling, etc. See the fine application of the word in Hamlet's soliloquy, iii. 1, 75:—

'To sleep, perchance to dream: ay, there's the rub:'

134.—*That keeps him company*, who accompanies him (to-night).

135.—*Absence*, a euphemism for *death.* *No less material*, *i.e.*, of as much importance (as).

136-7.—*Must embrace the fate of that dark hour.* A highly poetical phrase. Even the hardened Macbeth cannot refer to the death of the boy without expressing, though indirectly, something of pathetic regret. A little of 'the milk of human kindness' still remains in him. Here Shakspere's exquisite art appears. In plain prose, the meaning is simply, 'Fleance must die at the same time;' or, with more feeling, 'Fleance must suffer the same dreadful fate.'

Resolve yourselves apart, decide, come to a resolution by yourselves, when you have left me.

138.—*Anon*, soon (strictly, *at once*; see i. 1, 10). *We are resolved*, we are determined, decided (already). This sort of passive form corresponds to the reflective, 'resolve yourselves.' If a reflective verb is made passive, the nominative pronoun of the active must disappear altogether.

139.—*Straight*, straightway, immediately. *Abide within*, stay inside, wait in the palace.

140.—*It is concluded*, it is settled (since they consent).

141.—*Thy soul's flight*, etc., a metonymy: 'Thy soul, as it flies (from earth),' etc. Observe again the rhyming couplet at the close of a scene.

SCENE II. *The Palace.*

This scene represents the mutual position of Macbeth and his wife at this time in relation to the course of violence on which he has embarked. He does not now need instigation from her, but rather conceals from her his further cruel designs. Still he cannot disguise his feelings, and he gives indefinite intimations of 'a deed of dreadful note' to be done that night. It is evident that she has ceased to be a partner in his crimes, though she is still anxious that he shall not reveal to others what is passing in his mind by his 'rugged looks' and his agitated manner. She has discovered, like her husband, that there is no happiness in the royal state which they have gained by such foul means, and she feels that death itself would be better than 'the doubtful joy' in which they now 'dwell.' Her short soliloquy (5-8) expresses the deepest despondency of soul, and anticipates her further remorse and misery (Act v. i.).

NOTES.

1-3.—*Is Banquo gone from court?* Lady Macbeth appears to have some suspicion that there was a mystery about Banquo's movements, which she desires to fathom.

4-5.—*Nought's had, all's spent*, etc., we possess nothing, but have lost everything when we have gained what we desire, but are not satisfied with it.

6.—*That which*, for *him whom.*

7.—*By destruction*, through having destroyed (actively taken).

9.—*Sorriest*, most wretched, miserable, *fancies.* In the old sense of the word, like 'a sorry sight,' ii. 2, 20.

10.—*Using*, indulging in, retaining, as friends, those memories, etc. This is an old meaning of the word '*use*.' 'Fancies' and 'thoughts' are personified: '*They should have died.*'

11.—*Without all remedy*, for which there is no cure. '*Without*' = beyond,—the opposite of 'within' (1-139). *All* = every form of, any.

13.—*Scotch'd*, hacked, wounded (literally, cut across transversely). The word occurs once more in Shakspere: 'He scotched him and notched him like a carbonado' (*i.e.*, a grilled steak). *Coriolanus*, iv. 5, 98. But this expressive word, which has become fixed in the text, is only a conjectural emendation; the first and other folios read 'scorched.'

14.—*She'll close*, her wounds will heal. *Poor*, weak.

15.—*Remains in danger of her former tooth*, is still liable to be bitten by her with all her original force and venom. In this highly-wrought allegorical passage the 'snake' stands generally for the difficulties which have lain in his path, whether in the form of persons or things.

16.—*The frame of things*, the whole world. *Disjoint*, fall to pieces, to ruin. The verb is used intransitively. *Both the worlds* suffer, let earth and heaven be destroyed, perish.

17.—The plural pronouns *we*, *us*, in this passage evidently refer both to Macbeth and his wife, though with somewhat of the 'royal' style throughout.

Eat our meal, *i.e.*, simply 'eat.' But the phrase indicates that their fear makes eating, that which should be an enjoyment, a mere formal *taking of meals.* Observe the singular collectively used for the plural.

18.—*In the affliction of*, afflicted, tormented by.

19.—*Nightly*, every night. (It would be) *better* (for us to) *be*, etc.

20.—*Our peace*, safety to ourselves. *To peace*, to the peace and rest of the next world. There is a bitter play upon the word.

21.—*On the torture of the mind to lie*, to be racked, tormented. There is an allusion to what was well known in Shakspere's time, the rack, the instrument of torture for obtaining evidence by force. (Torture is from *torqueo*, *tortum*, to twist.)

22.—*Ecstasy*, used for overwhelming agitation of soul. It is also used in Shakspere's time for madness, but at present only for extreme joy. (Greek *ek*, *stasis*, standing out) (out of one's self, as it were).

23.—In this most poetical expression Macbeth rather describes life from his own miserable subjective feelings, than as it was to the 'good Duncan.'

25.—*Domestic* is opposed to 'foreign.' *Levy*, properly, the raising of troops, but used by metonomy for *invasion*.

27.—*Gentle my lord*, for 'my gentle lord.' 'My lord' is treated as one word (like '*milordo*' and French *monsieur*), and qualified by the adjective 'gentle.' *Sleek o'er*, soften, smooth, calm. The word is generally an adjective. *Rugged*, rough, agitated.

28.—*Jovial*, cheerful (originally an astrological term: 'under the influence of Jupiter').

30.—*Let your remembrance apply to Banquo*, remember to attend to him. It is evident from this that Macbeth intended to keep the murder of Banquo concealed from the Queen.

31.—*Present him eminence both with eye and tongue*, show him special attention both in looks and words.

32-3.—*Construe* (It [*i.e.*, the state of things] being) *unsafe* (for us) *the while that we must*, etc.; *i.e.*, while we are obliged to, etc. But both the grammar and sense are unsatisfactory, and it is generally supposed that the text is corrupt.

33.—*Lave our honours in these flattering streams*, dip, stain our honour by these (polluting) streams of flattery. *Honours*, another plural abstract, used distributively. *Lave*, from *lavo*, 'to wash.'

34.—*Make our faces visards*, use our faces as masks. The *visard*, or *visor*, was the movable part of the helmet covering the face, with holes for the *eyes* (from Latin *video*, *visum*, 'to see').

36.—*Scorpions*, torturing thoughts.

37.—*Banquo and his Fleance lives.* Another singular verb with a compound subject.

38.—*Copy.* This is another technical legal term; in full, '*Copy of court roll*,' *i.e.*, the deed by which a copyhold tenant held land of the lord of the manor. In Shakspere's metaphor *man* is the tenant, *life* is the copyhold, and *nature* is the proprietor, the lord of the manor. The sense of the whole passage *In them nature's copy's not eterne*, is, 'The life granted by nature is not held for ever:' = 'But they are not immortal.' *Eterne* is not an abbreviation of *eternal*, but directly from the Latin *æternus*.

40.—*Jocund*, cheerful, lively; *cf. jovial*, 28.

41.—*Flight* is a cognate object. *Cloistered* = in the cloisters, as of abbeys, etc., where they are accustomed to fly. *Black Hecate's summons* (to her votaries to perform their midnight rites).

42.—*The shard-borne*, carried by wings covered with scaly cases. The 'shard-borne beetle,' the flying beetle. *Shard*, or *sherd* (*cf. potsherd*), is a broken piece of pottery, also a beetle's wing and case.

43.—*Yawning* (causatively used) = producing yawning, like 'drowsy' in the previous line.

44.—*Note*, mark, character, nature.

46.—*Seeling night*, night which covers all things with 'obscurity.' *Seel* (a different word from *seal*) was used of fastening up the eyes of a hawk.

47.—*Scarf up*, cover over as with a scarf. *Tender* and *pitiful* is applied to the day, because it allows the painful nature of bloody deeds to appear, and thus arouses compassion.

49.—*Cancel*, annul; properly to draw lines (L. *cancelli*, bars) over the terms of the writing. *Great bond*, *i.e.*, the life of Banquo (see 38 and note). He calls it *great* because it is all important with reference to his own fate.

51.—*Rooky*, filled with rooks, crows. But there was an old word *roky* (from *roke*, *i.e.*, *reek*, steam, smoke), which meant *misty*, and hence *rooky* has been interpreted by some as *dark*, *gloomy*. But it is doubtful if the word was known to Shakspere.

53.—*Whiles*, the adverbial genitive of *while*. *Preys*—we should now say 'prey' (*cf. loves*, 1, 121, and *honours*, l. 33).

54.—*Marvell'st*, from L. *mirabile* [*miror*, I wonder, through the French]. *Thee* is reflective for *thyself*.

56.—*Prithee.* (I) pray thee; used as in a courteous request.

Throughout this scene, as on former occasions, Macbeth's affection to his wife, shown not only by special terms of tenderness (as 'love,' 29; 'dear wife,' 36; 'dearest chuck,' 45), but also in the general tone in which he addresses her, produces a striking dramatic effect. Taken with the touches of nature and conscience which appear occasionally in him, it serves to redeem his character from utter harshness and cruelty. At the same time, it stands in strong opposition to the ruthlessness of his conduct toward others, and assists in heightening the hideousness of his guilt by the very contrast.

(*To be continued.*)

—o—

My Drawing Examination and how it was Conducted.

BY A HEAD TEACHER.

Standard I.

1. A perpendicular line was drawn on the blackboard.

2. From its base a horizontal line was drawn.

3. A line was then drawn dividing the right angle into two unequal acute angles.

4. From the end of the base line another line was drawn making an obtuse angle of about 120°.

The above was done by the teacher at the request of the inspector. The children were questioned at each step on perpendicular and horizontal lines, and on right, acute, and obtuse angles.

The boys were then instructed to draw the following figure, first with rulers and afterwards without. One figure was drawn on the upper half of the slate, the other on the lower—a line separating them.

Standard II.

1. The teacher was instructed to draw a square on the blackboard.

2. The diagonal was drawn.

3. Two lines parallel to the diagonal were drawn joining the middle points of adjacent sides.

As the drawing progressed the boys were questioned on perpendicular, horizontal and parallel lines, and on right, acute, and obtuse angles. The teacher pointed them out and the boys named them.

They were then required to draw the following figure, first with rulers and afterwards without.

The boys divided the paper into two parts by drawing a line across the middle.

NOTE.—The inspector mentioned that he should prefer the boys to have two papers in future, so that the ruled figure might be drawn on one and the freehand on the other.

Ample time was allowed to every standard to complete the drawings. In the lower standards it was practically unlimited.

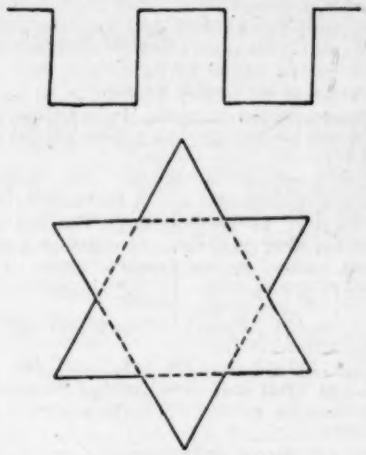
STANDARD III.

Half the class had the following freehand copy to draw. It was pinned on the blackboard and they were told to make it as large as the paper would allow.

The reverse side to that on which the names, &c., were written, was to be used.

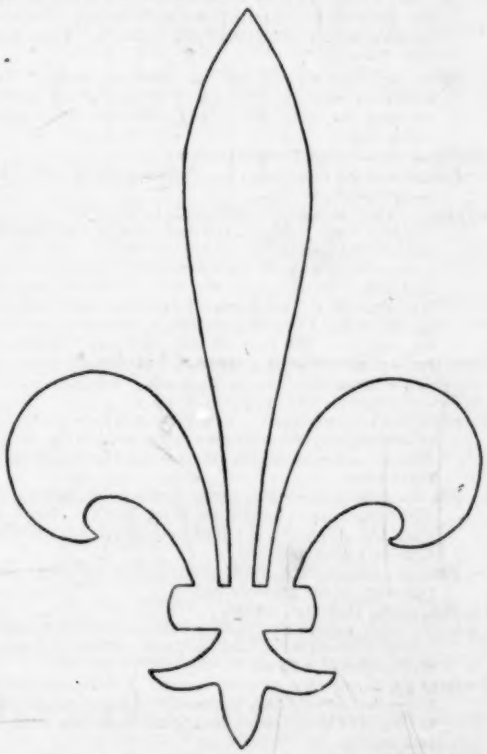
The other half had cards given. These boys were separated from each other by the boys working freehand, and all the cards were alike.

The card contained two figures, and the boys were instructed to draw them one beneath the other, rulers and set squares being used.



STANDARD IV.

The following freehand copy was pinned on the blackboard, and half the class had to draw a copy which would fill $\frac{3}{4}$ of the paper.



The other half took scale drawing, the cards distributed being marked alternately 'On plain paper' and 'On squared paper.'

The following were the problems:—

1. This is the front view of a triangular-shaped pigeon cote. Copy it twice the size.

2. Copy the dust-pan. Scale $\frac{1}{2}$ in. to 1 ft.

1. This drawing is the front view of a sentry box. Each square stands for 2 ft.
2. This drawing shows a large screw. Each square stands for $\frac{1}{4}$ in.

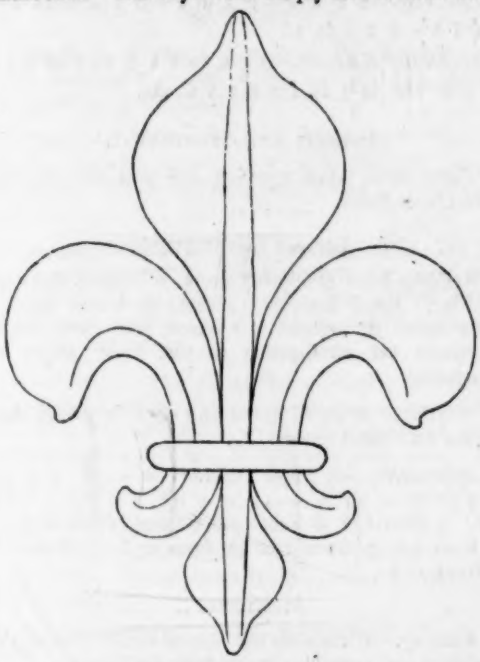
1. Copy the wine-glass three times the size.
2. Draw the chest of drawers.

1. Draw the swing. Two squares stand for 1 ft.
2. Copy the box (a sea chest). Three squares stand for 1 ft.

Standard V.

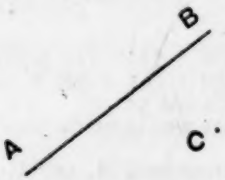
This standard was divided into three parts.

Freehand:—The following copy was pinned on the blackboard. The boys were simply told to draw it.



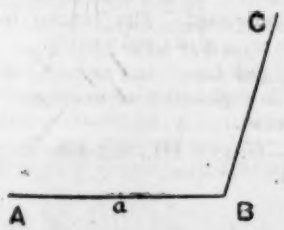
Geometry:—The following were the problems.

1. Draw a line through the point C parallel to AB.



2. Make an isosceles triangle, the base to be $1\frac{1}{2}$ in. and the angles at the base 45°.
3. Construct a triangle having sides $1\frac{1}{2}$, $2\frac{1}{4}$, and $2\frac{1}{2}$ inches respectively.

1. Given two lines AB, BC. From the point *a* in AB draw a line parallel to BC.



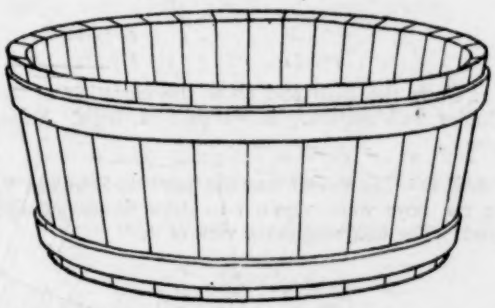
2. Construct a square on a base line $1\frac{3}{4}$ in. long.
3. Make a circle passing through the three points A, B, C.

Model:—The model was a fancy flower pot on a stand. The whole was placed on a stool, but the boys were told to draw the flower pot only. The following is the view of it.

Standard VI.

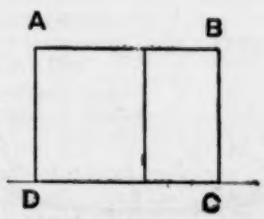
This standard was divided into three divisions.

Freehand:—Each boy had a copy given him of a circular tub. The following is a copy of it.



The following note was on the card:—'This example is to be copied a little larger. No ruling, squaring, or measuring is allowed.'

Geometry:—



1. A B C D is the elevation of a cube. Show the plan.

They were then required to draw the following figure, first with rulers and afterwards without.

The boys divided the paper into two parts by drawing a line across the middle.

NOTE.—The inspector mentioned that he should prefer the boys to have two papers in future, so that the ruled figure might be drawn on one and the freehand on the other.

Ample time was allowed to every standard to complete the drawings. In the lower standards it was practically unlimited.

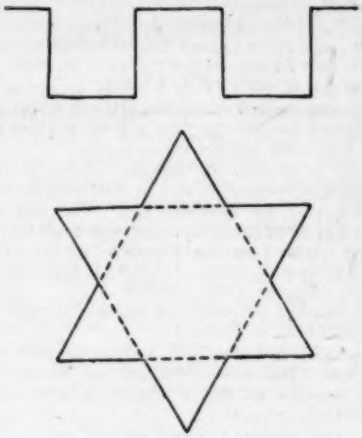
STANDARD III.

Half the class had the following freehand copy to draw. It was pinned on the blackboard and they were told to make it as large as the paper would allow.

The reverse side to that on which the names, &c., were written, was to be used.

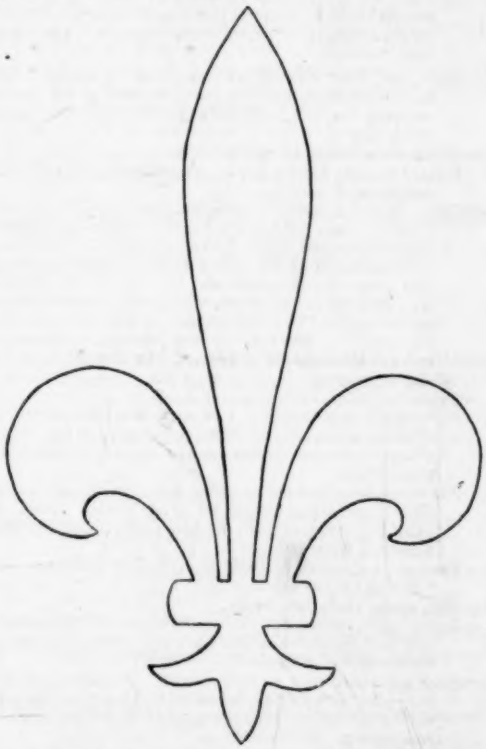
The other half had cards given. These boys were separated from each other by the boys working freehand, and all the cards were alike.

The card contained two figures, and the boys were instructed to draw them one beneath the other, rulers and set squares being used.



STANDARD IV.

The following freehand copy was pinned on the blackboard, and half the class had to draw a copy which would fill ¾ of the paper.



The other half took scale drawing, the cards distributed being marked alternately 'On plain paper' and 'On squared paper.'

The following were the problems:—

1. This is the front view of a triangular-shaped pigeon cote. Copy it twice the size.
2. Copy the dust-pan. Scale ½ in. to 1 ft.

1. This drawing is the front view of a sentry box. Each square stands for 2 ft.

2. This drawing shows a large screw. Each square stands for $\frac{1}{4}$ in.

1. Copy the wine-glass three times the size.

2. Draw the chest of drawers.

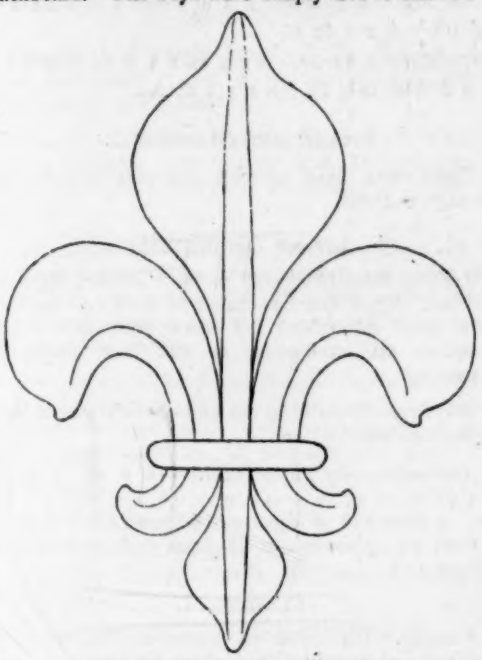
1. Draw the swing. Two squares stand for 1 ft.

2. Copy the box (a sea chest). Three squares stand for 1 ft.

Standard V.

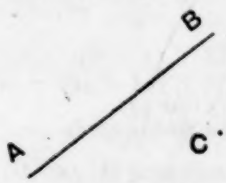
This standard was divided into three parts.

Freehand:—The following copy was pinned on the blackboard. The boys were simply told to draw it.



Geometry:—The following were the problems.

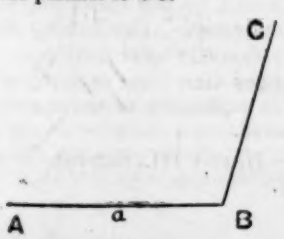
1. Draw a line through the point C parallel to AB.



2. Make an isosceles triangle, the base to be $1\frac{1}{2}$ in. and the angles at the base 45°.

3. Construct a triangle having sides $1\frac{1}{2}$, $2\frac{1}{4}$, and $2\frac{1}{2}$ inches respectively.

1. Given two lines AB, BC. From the point *a* in AB draw a line parallel to BC.



2. Construct a square on a base line $1\frac{3}{4}$ in. long.

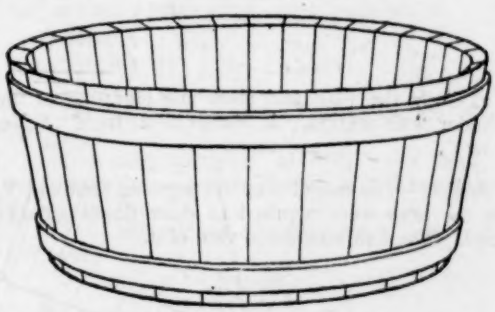
3. Make a circle passing through the three points A, B, C.

Model:—The model was a fancy flower pot on a stand. The whole was placed on a stool, but the boys were told to draw the flower pot only. The following is the view of it.

Standard VI.

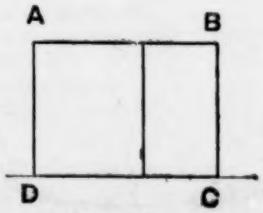
This standard was divided into three divisions.

Freehand:—Each boy had a copy given him of a circular tub. The following is a copy of it.

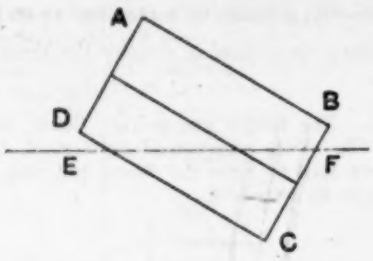


The following note was on the card:—'This example is to be copied a little larger. No ruling, squaring, or measuring is allowed.'

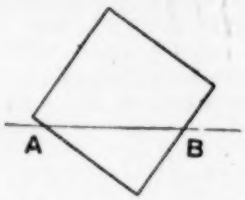
Geometry:—



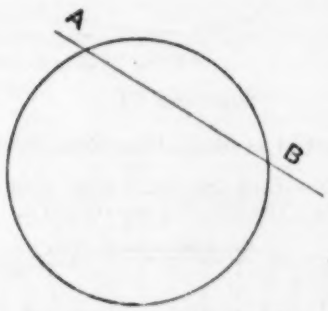
1. A B C D is the elevation of a cube. Show the plan.



2. A B C D is the plan of a right prism, the bases of which A D and B C are squares. Show the elevation and section E F.



1. This is the elevation of a cube. Show the plan and section A B.



2. Copy the plan and show the elevation of the cylinder with section. It stands 8 ft. high. Scale, $\frac{1}{4}$" to 1'.

Model:—The model was the same as Standard V, but the boys were required to draw flower-pot and stand. The following is the view of it.

How a Scotch School was Examined.

Music.—A list of Songs was handed to the Inspector who chose *two*, one of which was to be sung first to the syllables and then to the words.

Note Test:—**d m r l s fe s d' s r l f d s, l, t, d f fe s s r d.** Each note sung to a beat and slowly.

Time Test:—

|1.1	:1	:1 |1	:1.1:	|1.1	:1.1	:1 |	:1 :1.1}
|1.1	:1.1	:1.1|	:	:1 |1	:1	:1.1|1	: :1 ||

N.B.—Children were asked to beat their own time.

Ear Test:—**d r m d — s l l r — m f l s fe s — s s l t — d' r f fe s.**

Modulator Exercise:—**m r s fe s l d' ta l se l f r fe s d' t d' ta s fe f m r s t d'**, &c.

INFANTS AND STANDARD I.

These were taken together and only one song was asked from them.

INFANT DEPARTMENT.

Reading from Blackie's Complete Primer, pages 21 and 22. Pupil Teacher examined them and spellings were asked throughout the lesson, with some simple questions on intelligence to test their ability in answering.

Writing.—From K to the end of the alphabet, both capital and small letters.

Arithmetic.—By Pupil Teacher—8 + 5? 2 + 3? 4 + 5? 5 + 3? 6 + 4? 9 + 6? 8 + 7? 9 + 8? &c. 7 from 13? 6 from 10? 6 from 11? 2 from 6? 5 from 9? 7 from 12? 8 from 15? 3 from 12? 4 from 10?

STANDARD I.

Reading.—Blackie's First Graded Reader, page 78—spellings and questions throughout the lesson.

Writing.—*Three* lines were transcribed from the same lesson.

Arithmetic.—

(1) 356 + 408 + 92 + 694 + 887.
(2) 932 + 356 + 685 + 309 + 94.
(3) From 6073 take 987.

The above were read in words.

STANDARDS II. AND III.

Reading.—These standards read together Blackie's Third Graded Reader, pages 185 and 123. They were questioned on the lessons. Nouns, Verbs, and Adjectives were pointed out A simple sentence was written on the black board containing subject and object enlarged by two or three adjectives, as also the predicate extended by two extensions, which had to be analysed and parsed. The Teacher likewise gave them a lesson on analysis and parsing.

Poetry.—'Lucy Gray' was repeated slowly to the meaning. The explanation of words and phrases was carefully required.

Dictation.—II. and III. together—from page 45, paragraph 15.

Arithmetic.—

(1) Divide 4,906,357 by 907.

(2) Multiply 609,875 by three thousand nine hundred and eighty.

(3) Divide eight hundred and seventy six thousand and nine by seven hundred and five.

(4) From nine thousand and eight pounds sixteen shillings take eighteen shillings and sevenpence farthing.

History.—Lives of Bruce and Mary very minutely.

Geography.—Physical features of Scotland, especially West Coast—manufacturing towns.

STANDARD IV.

Reading.—Blackie's Standard IV. Reader, page 126, paragraphs 7 and 8, for analysis and parsing. Questioned on the lesson.

Poetry.—'The Wreck of the Hesperus.' This had to be repeated very slowly and distinctly to the meaning, with a thorough knowledge of words and phrases.

History.—Taken by Pupil Teacher.—The Civil War —Anne's Reign—the Inspector very particular as to the dates and causes of Wars. The various Acts of Parliament formed the subjects of careful inquiry as to terms and causes.

Geography.—The six northern Counties of England —physical features with heights of mountains, courses of rivers with tributaries, towns, chief seats of industries and sea-ports, &c., all minutely gone into.

Arithmetic.—

(1) Multiply £19 6s. 11¾d. by 705.

(2) Reduce £109 17s. 6d. to sixpences.

(3) How many seconds in 2,000,000 days and 6,000 minutes?

(4) Divide 1,329 quarters 5 bushels by 88.

STANDARDS V., VI. AND EX. VI.

Reading.—Taken together from Blackie's Fifth Reader, pages 66—67.

Parsing and Analysing.—A compound sentence—very particular about the verb as to its voices and tenses.

Poetry.—'Deserted Village,' together with 'Night' for VI. and Ex. VI.

STANDARD V.

Writing.—A family in a country house had a fancy for rearing ducks, but could not well do so on account of rats, which systematically got hold of and carried away the young ducklings, even when close to their mother. With a view to circumvent the rats, the maternal duck and her young were housed for the night under a coop, which admitted of no opening for the furtive intruders. The rats were not to be so easily cheated of their prey. On discovering that the mother duck and her family were closely shrouded from intrusion, they devised a pretty plan of engineering, which was eminently successful. In the course of a single night they excavated a tunnel going below the outer edge of the coop up into its interior, and thus very neatly, without producing any alarm, stole every duckling from under the guardianship of its mother.

N.B.—The Teacher was allowed to read over the story with explanation before the Inspector gave the second reading.

History.—Seven Years' War—Pragmatic Sanction War—cause and battles—South-Sea Scheme—Napoleon—Peninsular War—Battles and Prime Ministers—Elba—St. Helena.

Geography.—Capitals of European countries—features, chiefly rivers and mountains—chief towns of France, Spain and Italy.

Arithmetic.—

(1) Find by Practice the value of 97 articles at £1 16s. 8d. each.

(2) Make out the following Bill:—

1 cwt. at 1s. 4d. per lb.
12 stones at 3d. per lb.
14 hams, each 10 lbs. at 9½d. per lb.
30 boxes at 1s. 2d. per box.

(3) If 12 bushels cost £2 2s. what will 5½ quarters cost?

(4) Add together $2\frac{3}{5} + 5\frac{1}{7} + \frac{6}{13} + \frac{8}{9}$.

STANDARD VI. AND EX. VI.

History.—Indian Mutiny—Crimean War and other Wars—with causes and battles, with Commanders —very particular about Prime Ministers and Bills.

Geography.—On slates.—Maps of Africa, India, S. America and Australia were drawn on slates—questions were asked on the physical features of N. America, S. America, Australia and India.

Composition.—Five topics were given about the district, places familiar to the pupils, and each pupil had to write a letter about one of such topics.

Arithmetic.—

1. Simplify $\frac{3\frac{1}{4} - 7\frac{1}{8}}{\cdot 6 - \cdot 35}$.

2. Reduce $\frac{1}{15}$ of 1s. to the fraction of 5s.; of 1d.; of £1.

3. If 8 men do a piece of work in 26 days how many men should be required to do 3 times as much in half the time?

4. Find the interest of £900 for 40 days at 3½ per cent.

Specifics.

Mathematics—1st.—

1. If $a = 3$, $b = 2$, $c = 1$, and $d = 0$, find the numerical value of—

(1) $ab - cd + abc$ (2) $a^2b + 3bc^2 - (bc + 3ac - ab)$.

2. From $abc - xy^2 + 3a^2b - a + b$ take $xy^2 + a^2b + a + b - abc$.

3. What is an acute angle? a square? an equilateral triangle? give illustrations.

4. From a given point draw a straight line equal to a given straight line.

Mathematics—2nd.—

1. Simplify:— $\frac{x^3 - y^3}{x^3 + y^3} \times \left(\frac{x+y}{x-y}\right)^2 \div \frac{x^2 + xy + y^2}{x^2 - xy + y^2}$.

2. The sum of 2 numbers is 324. Their difference is ⅓ of the greater. Find the numbers.

3. Solve: $1\frac{1}{2}x - 15\left(\frac{1}{4}x + \frac{1}{5}x\right) = 54\frac{1}{2} - 15x$.

Euclid (taken orally) I. 35, 39, 41, 48.

Magnetism—1st—

1. What is a loadstone? How would you magnetize a piece of iron with a loadstone?

2. A magnet is broken in two: describe the condition of the parts.

3. State the law of attraction and repulsion. If you were asked to prove it how would you do it?

4. To what changes are compasses liable in iron ships? and how is the difficulty removed?

Electricity—2nd—

1. Explain the terms:—Vitreous and Resinous as regards electricity and show that these terms are unsuitable. Show that the two kinds can be got from glass.

2. How would you construct a gold-leaf electroscope? What are its uses?

3. An electrically excited glass rod is brought near a pith ball hung from a silk thread: what is the action of the ball?

4. What is induction and what conduction? Show how to charge an electroscope by induction.

Physical Geography—2nd.—

1. Give a short description of the Atlantic, noting its extent, chief branches, currents, depths, boundaries, and saltness.

2. Why are tides higher at some periods than at others? In what kind of seas are tides small? Give examples.

3. Describe the currents of the Indian Ocean.

4. What are *neap* tides and what *spring* tides? When do they occur?

Physical Geography—3rd.—

1. How many motions has the earth? Name them and tell what each causes?

2. Name the planets in the order of their size. What are the superior planets? Why are they so called?

3. Explain:—Ecliptic, equinox, equator, conjunction, aphelion, solstice, and satellites.

4. The sun is nearest us in winter? Why have we then the coldest seasons?

Agriculture—2nd.—

1. Describe the *potash manures.*

2. (*a*) Why is drainage of soil necessary? (*b*) Describe a good system of drainage.

3. Give a list and tell what you know of the 'ash' ingredients of plants.

VERE FOSTER has already distributed £2,478 2s. 6d. in prizes for penmanship and drawing. The National Competition was instituted in 1870, and the pupils of nearly 4,000 schools of all classes throughout the British Empire have taken part. During the past year there have been 673 competitors in ordinary writing, 49 in plain and ornamental lettering, 382 in drawing, and 87 in painting. 492 boys have competed and 606 girls, representing 20 counties in Ireland and 50 in Great Britain.

Four sets of prizes for writing are awarded this year, namely, for copies of the Original Series of Copy-books, and for copies of No. 7, Nos. 13 & 14, and Nos. 16 & 17 of the recently published Bold or Civil Service Series. The highest prize for the Original Series is awarded to Annie Kate Leddy, age 16, a pupil of Millcastle National School, county Westmeath; that for No. 7 of the Bold Series to Lucy Elinor Richards, age 17, of New Barnet; and those for Nos. 13, 14 and 16, 17 to Ellie M. Leddy, age 17, of Millcastle National School.

In lettering the work is generally good. The two highest prizes are awarded to Thomas C. Dunlop, of Kilmarnock Academy, Ayrshire, and William Brown, of Kilmarnock House, New Ross, county Wexford, both aged 17.

In drawing and painting the competition continues to be very satisfactory, and there is a larger number of competitors than in any previous year.

A similar competition is invited for next year.

Science Notes.

THE rare metal Uranium was discovered by Klaproth in 1789. It was named after the planet Uranus, then recently discovered by Herschel. It is not very abundantly distributed in nature, its chief ore being pitchblende, which has been found in Cornwall and a few other localities. The pure metal has a Specific Gravity of 18·3, nearly as heavy as gold, 19·2. It is malleable and hard, with a colour like that of nickel, and not liable to tarnish in the air. The rarity of the metal is indicated by its market price, which is about £2,400 per ton. Several oxides of the metal are known, the commonest being the sesquioxide, which forms a number of beautiful yellow salts. It is used for imparting delicate golden tints to glass, while the protoxide is used for the manufacture of costly black porcelain. Uranium is also found useful in photography as a substitute for the chloride of gold, but its high price has hitherto prevented the extension of its applications.

Recently a continuous lode has been found at the Union Mine Cornwall, which is believed to be the only known lode in the world. The ore is found to contain an average of 12% of pure metal. It is anticipated that the present discovery will enable two important applications of the metal to be followed up, viz.:—in electro-plating and electric-lighting. As it forms with copper and platinum very beautiful alloys having the appearance of gold and resisting the action of acids, it will be used as a substitute for gold in electro-plated wares. As it also possesses very high electric resistance it will also be used in the newer developments of electric lighting.

***

THE following remarks on museums by Professor Flower in his inaugural address will be read with interest and profit by many of our readers. 'The first consideration in establishing a museum, large or small, either in a town, institution, society or school, is that it shall have some definite object or purpose to fulfil; and the next is that means shall be forthcoming not only to establish but also to maintain the museum in a suitable manner to fulfil that purpose. Some persons are enthusiastic enough to think that a museum is in itself so good an object that they have only to provide a building and cases and a certain number of specimens, no matter exactly what, to fill them, and then the thing is done. Whereas the truth is, the work is only then begun. What a museum really depends upon for its success and usefulness is not its building, not its cases, not even its specimens, but its curator. He and his staff are the life and soul of the institution, upon whom its whole value depends, and yet in many, I may say most, of our museums they are only the last to be thought of. The care, the preservation, the naming of the specimens are either left to voluntary effort, excellent often for special collections and for limited time, but never to be depended upon as a permanent arrangement; or a greviously under-salaried and therefore uneducated official is expected to keep in order, to clean, dust, arrange names, and display, in a manner which will contribute to scientific knowledge, collections ranging

in extent over almost every branch of human learning, from the contents of an ancient British barrow to the last discovered bird of paradise from New Guinea.

The primary principle which should underlie the arrangements of all museums is, the distinct separation of the objects for which collections are made, the publicly-exhibited collections being never made a store room or magazine, but only such as the ordinary visitor can understand and profit by, and the collection for students being so arranged as to afford every facility for examination and research.'

***

The Agricultural Laboratories in Belgium seem to be doing very serviceable work for those engaged in farming. Every person living in Belgium who buys not less than a ton of feeding stuffs can have samples of these analysed free of cost to him at the Laboratory in his district. Not only are analyses made free of cost, but information on the best modes of using manures and food stuffs is supplied by these agricultural institutions.

***

It is well occasionally to listen to the opinion of men eminent in scientific and commercial pursuits on matters purely educational. We are pressed on many sides to consider the subject of technical education as one of prime importance. Sir L. Bell, in his address to the British Association, referred to the question of technical education. 'I have not yet been able to learn,' he says, 'the precise position the subject occupies in the minds of its most earnest advocates. If it means, as is sometimes alleged, a system which, along with scientific instruction, manual dexterity in the use of tools, or a practical knowledge of various manufacturing processes, has to be acquired, I confess I am not sanguine as to the results. Certain I am that if foreign workmen are more skilful in their trades, which as a rule I doubt and which in the iron trade I deny, this superiority is not due to scientific training in the manner proposed, for in this they possess, so far as I have seen, no advantage over our own workmen. My objection to the whole system is the impossibility of anything approaching a general application being impracticable. I have not a word to say against the rudiments of science being taught wherever this is possible. The knowledge so obtained may often give the future workman a more intelligent interest in his employment than he at present possesses, but I think they who expect much good to attend such a thin veneer of chemistry or physics do not take sufficient account of the knowledge possessed by more highly-educated men who are now directing the great workshops of the world. It is by extending and enlarging this that substantial aid has to be afforded to industry and science, and not by teaching a man a mere smattering in our primary or any other schools. In the case of young people, who from necessity must leave the schoolroom at an early age, my own leaning is toward the present system, with the addition of drawing and some natural science. After this, probably, the play-ground will be found more useful and much more popular with school boys than trying to learn a trade by means of tools, which, before he has to use them in earnest, may be thrown into the scrap heap.'

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher*, *Pilgrim Street, Ludgate Hill, London, E.C.*

Arithmetic.

1. M. R.—Two merchants join their capitals, which are such that for every £3 A puts in, B contributes £4. At the end of 4 months, A increases his capital by ¼, while B withdraws ⅔ of his. How should the year's profit of £441 be divided between them?

(*Certificate Exam., Females 2nd Year, Scotland, 1856.*)

In proportion—

For A :—$(£3 \times 4) + (£4 \times 8) = £12 + £32 = £44$;
For B :—$(£4 \times 4) + (£1 \times 8) = £16 + £8 = £24$;
Total amount $= £44 + £24 = £68$;

£ £ £
$\therefore$ 68 : 44 :: 441 : A's share
17 11 11

17 | 4851

£285 7s. 0⅓d.

A's share = £285 7s. 0⅓d.
B's share = £155 12s. 11⅔d. } Ans.

2. Nedrac.—A man and a dog are going towards a tree. Their respective distances from the tree are in the ratio of 5 : 12. Three-quarters of a minute later they are in the ratio of 4 : 9. Three-quarters of a minute later still they are in the ratio of 1 : 2. How long will the dog be overtaking the man, and how long will the dog be in reaching the tree? (*Pendlebury.*)

At first ratio is 5 : 12,
¾ minute later it is 4 : 9,
,, ,, still it is 3 : 6;

It is therefore evident that the dog's rate is 3 times the man's rate.

$\therefore$ Time when the dog overtakes the man

$= ¾$ min. $\times \frac{12-5}{3-1}$

$= (¾ \times 7/2)$ min.
$= 2\frac{5}{8}$ min. Ans.

$\therefore$ Time when the dog reaches the tree

$= ¾$ min. $\times 4/3$
$= 3$ min. Ans.

3. IVA JONES.—The 3 per cents. are at 91½ and the 3½ per cents. at 96½. A person has a sum of money to invest which will give him £100 more of the former stock than of the latter. Find the difference of income he would obtain by investing in the two stocks.

$$\text{Stock in first case} = \frac{\text{Sum} \times 100}{91\frac{1}{2}},$$

$$\text{,, second ,,} = \frac{\text{Sum} \times 100}{96\frac{1}{2}};$$

$$\therefore \frac{\text{Sum} \times 100}{91\frac{1}{2}} - \frac{\text{Sum} \times 100}{96\frac{1}{2}} = 100$$

$$\frac{\text{Sum}}{91\frac{1}{2}} - \frac{\text{Sum}}{96\frac{1}{2}} = 1$$

$$96\tfrac{1}{2}\,\text{Sum} - 91\tfrac{1}{2}\,\text{Sum} = 96\tfrac{1}{2} \times 91\tfrac{1}{2}$$

$$5\,\text{Sum} = \frac{193 \times 183}{4}$$

$$\therefore \text{Sum} = \frac{193 \times 183}{20}\,£.$$

$$\text{Income in first case} = \left(\frac{193 \times 183}{20} \times \frac{3}{91\frac{1}{2}}\right) £$$

$$= \frac{193 \times 6}{20}\,£$$

$$= £57\ 18s.;$$

$$\text{Income in second case} = \left(\frac{193 \times 183}{20} \times \frac{3\frac{1}{2}}{96\frac{1}{2}}\right) £$$

$$= \frac{183 \times 7}{20}\,£$$

$$= £64\ 1s.;$$

$$\therefore \text{Difference in income} = £64\ 1s. - £57\ 18s.$$

$$= \underline{£6\ 3s.} \quad \text{Ans.}$$

4. ECCLESALL.—What sum of money lent at 5 per cent. per annum, Compound Interest, will amount to £904 1s. in 2½ years?

£
100
5
105 = Amount of £100 in 1 year
5·25
110·25 = ,, ,, 2 years
2·75625
£113·00625 = ,, ,, 2½ ,,
20
s. ·12500

£ s. £ s. £
∴ 113 0½ : 904 1 :: 100 : Sum.
20 20
2260 18081
8
18081

∴ Sum = £800. Ans.

5. MOUNTAINEER.—An ordinary train leaves Dundee at 10 a.m. and travels at the rate of 30 miles per hour; an express train leaves at 11.15 a.m. and travels on the same line at the rate of 45 miles an hour. Where will the second train overtake the first? *(Pupil Teachers' Exam., Scotland, First Year, 1888.)*

Time between the two departures = 11.15 a.m. — 10 a.m.
= 1¼ hours;

Distance travelled by ordinary train in this time
= 30 miles × 1¼
= 37½ miles;

Distance gained per hour by express train = (45 − 30) miles
= 15 miles;

Time when express train overtakes ordinary train from departure of express train

$$= \frac{37\frac{1}{2}}{15}\ \text{hrs.}$$

$$= 2\tfrac{1}{2}\ \text{hrs.}$$

$$= \tfrac{5}{2}\ \text{hrs};$$

Distance from Dundee when second train overtakes the first
= 45 miles × ⅝
= 112½ miles. Ans.

6. GEORGE GRAY.—Two velocipedes, A and B, start together along a road at 6 and 7 miles an hour respectively. The circumference of A's guiding wheel is 40 inches, that of B's 36 inches. How often will the same points of the guiding wheels which were in contact with the ground at starting be simultaneously in contact with the ground during the first hour of their progress?

No. of revolutions made by A's guiding wheel in an hour

$$= \frac{6 \times 63360}{\overset{1584}{\cancel{40}}}$$

$$= 9{,}504;$$

No. of revolutions made by B's guiding wheel in an hour
= 7 × 1760
= 12,320;

G. C. M. of 9,504 and 12,320:—

9504	12320
8448	9504
1056	2816
704	2112
352	704
	704

∴ No. of times = 352. Ans.

7. E. A. S.—A debt is to be discharged at the expiration of 4½ months; ⅓ is paid immediately, and ¼ at the expiration of 3 months; when ought the remainder to be paid?
(Barnard Smith.)

Debt × 4½ = (⅓ Debt × 0) + (¼ Debt × 3) + (1/12 Debt × Time in months)
4½ = (¼ × 3) + (1/12 × Time)
4½ = ¾ + 1/12 Time
1/12 Time = 4½ − ¾
= 3¾
∴ Time = 7½ months. Ans.

8. MYRTLE.—The fore wheel of a carriage is 12½ feet in circumference, and the hind wheel 13¾ feet in circumference. How many yards will the carriage roll before both wheels make an exact number of turns?

Circumference of fore wheel = 12½ ft.
= 50 qr. ft.,
,, hind ,, = 13¾ ft.
= 55 qr. ft.;

L.C.M. of 50 and 55
= 10 × 55
= 550;
∴ Distance = 5½⁰ ft.
= 2¾⁸ yds.
= 45⅝ yards. Ans.

General.

1. CONGLETONIAN.—You had better sit again and get a pass that will count for the D; you will want that in due course. The present success will count for something.

2. STONEHENGE.—The introductory volume on the teaching of Geography by Geikie (Macmillan) will help you. Also the new Geography of Europe by Dr. Mills (Macmillan). But really any good book would furnish the information you need if you use it thoughtfully. Productions depend largely, and in many cases entirely, on climate, and industry must depend upon it also. The natural character too will be largely determined by the climate. Compare a Hindoo, a Frenchman, and a Greenlander in this connection.

3. ZED.—Use Abbott's Via Latina; if you want a good book on Latin Composition use Bradley's Arnold's Latin Prose Composition.

A good Greek Grammar is Goodwin's or Smith's. The best Greek Dictionary for you is Liddell & Scott's smaller grammar, new edition.

If you are beginning Greek try Smith's Greek Principia, and Rushbrook's Greek Reader. They contain all the grammar you will want.

Use the new Geographies by Macmillan. 'Europe,' G. D. Mill's is just out. Phillip's Atlas will suit your purpose. In the way of an English Grammar try 'The Mother Tongue,' by Hewitt and Beach. J. Hughes.

4. LEHRER.—No. If you look at the syllabus, it is quite definite.

5. A. P. T.—Yes. You may sit. The writing is very poor indeed. Get a good set of copy books (Hughes) and practise daily.

6. MACTE ANIMO.—We cannot attend to anonymous queries.

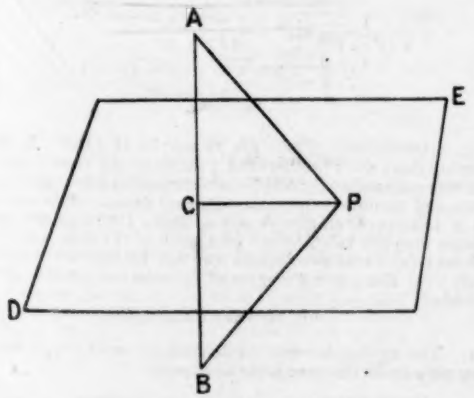
7. AUT CÆSAR AUT NULLUS.—
Verify $(\sec^2 A + \operatorname{cosec}^2 A)(1 - 2 \sin A \cos A) = (\sec A - \operatorname{cosec} A)^2$.
(*L.L.A. Degree, St. Andrew's, 1888.*)

$$(\sec^2 A + \operatorname{cosec}^2 A)(1 - 2 \sin A \cos A)$$
$$= \left(\frac{1}{\cos^2 A} + \frac{1}{\sin^2 A}\right)(1 - 2 \sin A \cos A)$$
$$= \frac{\sin^2 A + \cos^2 A}{\sin^2 A \cos^2 A}(1 - 2 \sin A \cos A)$$
$$= \frac{1}{\sin^2 A \cos^2 A}(1 - 2 \sin A \cos A)$$
$$= \frac{1 - 2 \sin A \cos A}{\sin^2 A \cos^2 A}$$
$$= \frac{\sin^2 A + \cos^2 A - 2 \sin A \cos A}{\sin^2 A \cos^2 A}$$
$$= \frac{(\sin A - \cos A)^2}{\sin^2 A \cos^2 A}$$
$$= \left(\frac{\sin A - \cos A}{\sin A \cos A}\right)^2$$
$$= \left(\frac{\sin A}{\sin A \cos A} - \frac{\cos A}{\sin A \cos A}\right)^2$$
$$= \left(\frac{1}{\cos A} - \frac{1}{\sin A}\right)^2$$
$$= (\sec A - \operatorname{cosec} A)^2.$$

Note.—The definitions, &c., can be obtained from any work on Trigonometry.

Geometry.

1. HORATIUS.—Given a plane and a point A without it, find another point B, so that every point in the plane is equi-distant from A and B; and given two points P and Q on opposite sides of a plane, find a point R in the plane, so that the difference of PR and QR may be a maximum.



Let A be the point and DE the plane.

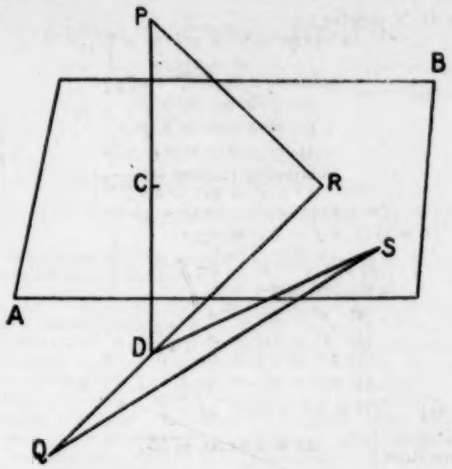
It is required to find a point B, so that every point in the plane may be equi-distant from A and B.

From A draw AC perpendicular to the plane, and produce it through the plane to B, so that CB is equal to AC.

Then every point in the plane is equi-distant from A and B.

Proof.—Let P be any point in the plane, and let a plane pass through A, B, and P.

Then since ACB is perpendicular to the plane DE, AB is at right angles to PC, and C is the middle point of AB, therefore PA is equal to PB. (I. 4.) Q.E.F.



Let P and Q be two points on opposite sides of the plane AB, and let P be nearer the plane than Q. Draw PC perpendicular to the plane, and produce it to D, so that CD is equal to PC.

Join QD and produce it in the plane passing through QDC to meet the plane AB in R, and join PR.

Then the difference between QR and PR shall be a maximum.

Proof.—Let S be any other point in the plane AB. Through QDS draw a plane.

DR is equal to PR, as proved in first part; therefore difference between QR and PR is equal to the difference between QR and DR, or QD.

The difference between QS and DS is less than the third side QD of the triangle QDS.

∴ R is the point required. Q.E.F.

Algebra.

1. J. R. J.—Solve:—
$2(x^2 + ax)^{\frac{1}{2}} + \sqrt{x} + \sqrt{a + x} = b - 2x$.
(*Todhunter.*)

$$2(x^2 + ax)^{\frac{1}{2}} + \sqrt{x} + \sqrt{a + x} = b - 2x$$
$$2\sqrt{x}(a + x)^{\frac{1}{2}} + \sqrt{x} + \sqrt{a + x} + 2x = b$$
$$[x + 2\sqrt{x}(a + x)^{\frac{1}{2}} + (a + x)] + \sqrt{x} + \sqrt{a + x} = b + a$$
$$(\sqrt{x} + \sqrt{a + x})^2 + \sqrt{x} + \sqrt{a + x} = b + a$$
Completing square $\}$ $[\sqrt{x} + \sqrt{a + x} + \frac{1}{2}]^2 = b + a + \frac{1}{4}$
$= c^2$ (say)
$$\sqrt{x} + \sqrt{a + x} + \tfrac{1}{2} = \pm c$$
$$\sqrt{a + x} = \pm c - \tfrac{1}{2} - \sqrt{x}$$
Squaring] $a + x = c^2 + \frac{1}{4} + x - c - 2\sqrt{x}(c - \frac{1}{2})$
or $c^2 + \frac{1}{4} + x + c + 2\sqrt{x}(c + \frac{1}{2})$
$$2\sqrt{x}(c - \tfrac{1}{2}) = c^2 - c - a + \tfrac{1}{4}$$
or $2\sqrt{x}(c + \tfrac{1}{2}) = a - c^2 - c - \frac{1}{4}$
$$\therefore x = \frac{(c^2 - c - a + \frac{1}{4})^2}{4(c - \frac{1}{2})^2}$$
or $\dfrac{(a - c^2 - c - \frac{1}{4})^2}{4(c + \frac{1}{2})^2}$,

Substituting values of c and c^2,

$$\therefore x = \frac{(b + a + \frac{1}{4} - \sqrt{b + a + \frac{1}{4}} - a + \frac{1}{4})^2}{4(\sqrt{b + a + \frac{1}{4}} - \frac{1}{2})^2}$$
or $\dfrac{(a - b - a - \frac{1}{4} - \sqrt{b + a + \frac{1}{4}} - \frac{1}{4})^2}{4(\sqrt{b + a + \frac{1}{4}} + \frac{1}{2})^2}$
$$= \frac{(b + \frac{1}{2} - \sqrt{b + a + \frac{1}{4}})^2}{4(\sqrt{b + a + \frac{1}{4}} - \frac{1}{2})^2}$$
or $\dfrac{(b + \frac{1}{2} + \sqrt{b + a + \frac{1}{4}})^2}{4(\sqrt{b + a + \frac{1}{4}} + \frac{1}{2})^2}$
$$= \frac{(b + \frac{1}{2} \pm \sqrt{b + a + \frac{1}{4}})^2}{4(\sqrt{b + a + \frac{1}{4}} \pm \frac{1}{2})^2}.$$

2. G. N.—Solve:—

$$\left.\begin{aligned} x^2 + 2yz &= y^2 + 2zx = a \\ z^2 + 2xy &= c \end{aligned}\right\}$$

(*Dalton's 'Algebra,' Part 2.*)

$$\left.\begin{aligned} (1)\ x^2 + 2yz &= a \\ (2)\ y^2 + 2xz &= a \\ (3)\ z^2 + 2xy &= c \end{aligned}\right\}$$

Subtracting (2) from (1):—

$$x^2 - y^2 = 2xz - 2yz$$
$$(x+y)(x-y) = 2z(x-y)$$
$$(x-y)(x+y-2z) = 0$$
$$\therefore x - y = 0$$

or $x + y - 2z = 0$;

In the first case $x = y$,

$$\therefore \left.\begin{aligned} (1)\ x^2 + 2xz &= a \\ (3)\ z^2 + 2x^2 &= c \end{aligned}\right\}$$
$$\left.\begin{aligned} (1)\ 2x^2 + 4xz &= 2a \\ (3)\ 2x^2 + z^2 &= c \end{aligned}\right\}$$

Adding] $4x^2 + 4xz + z^2 = 2a + c$

Extracting Square Root] $2x + z = \sqrt{2a + c}$

$$\left.\begin{aligned} (3)\ 2x^2 + z^2 &= c \\ (1)\ x^2 + 2xz &= a \end{aligned}\right\}$$

Subtracting] $x^2 - 2xz + z^2 = c - a$

Extracting Square Root] $x - z = \sqrt{c - a}$

$$2x + z = \sqrt{2a + c}$$
$$x - z = \sqrt{c - a}$$

Adding] $3x = \sqrt{2a + c} + \sqrt{c - a}$

$$\therefore x = \tfrac{1}{3}\left[\sqrt{2a + c} + \sqrt{c - a}\right].$$

$$2x + z = \sqrt{2a + c}$$
$$2x - 2z = 2\sqrt{c - a}$$

Subtracting] $3z = \sqrt{2a + c} - 2\sqrt{c - a}$

$$\therefore z = \tfrac{1}{3}\left(\sqrt{2a + c} - 2\sqrt{c - a}\right).$$

Taking] $x + y - 2z = 0,$

$$\therefore y = 2z - x;$$

$$\left.\begin{aligned} (1)\quad x^2 + 2z(2z - x) &= a \\ (3)\quad z^2 + 2x(2z - x) &= c \end{aligned}\right\}$$
$$\left.\begin{aligned} (1)\quad x^2 + 4z^2 - 2xz &= a \\ (3)\quad z^2 + 4xz - 2x^2 &= c \end{aligned}\right\}$$
$$\left.\begin{aligned} (1)\quad 2x^2 - 4xz + 8z^2 &= 2a \\ (3) - 2x^2 + 4xz + z^2 &= c \end{aligned}\right\}$$

Adding] $9z^2 = 2a + c$

$$\therefore z = \tfrac{1}{3}\sqrt{2a + c}.$$

$$(1)\quad x^2 + 4z^2 - 2xz = a$$

$$x^2 + \frac{4(2a + c)}{9} - \frac{2x\sqrt{2a + c}}{3} = a$$

$$x^2 - \frac{2x\sqrt{2a + c}}{3} = a - \frac{8a + 4c}{9}$$

$$= \frac{a - 4c}{9}$$

$$x^2 - \frac{2x\sqrt{2a + c}}{3} + \left(\frac{\sqrt{2a + c}}{3}\right)^2$$

$$= \frac{a - 4c}{9} + \frac{2a + c}{9}$$

$$= \frac{3a - 3c}{9}$$

$$x - \frac{\sqrt{2a + c}}{3} = \frac{\sqrt{3(a - c)}}{3}$$

$$\therefore x = \tfrac{1}{3}\left[\sqrt{2a + c} + \sqrt{3(a - c)}\right].$$

$$y = 2z - x$$
$$= \tfrac{2}{3}\sqrt{2a + c} - \tfrac{1}{3}\left(\sqrt{2a + c} + \sqrt{3(a - c)}\right)$$
$$= \tfrac{1}{3}\left[\sqrt{2a + c} - \sqrt{3(a - c)}\right].$$

3. CYMRO.—Solve:—

$$(p-1)^2 x^3 + px^2 + \left(p - 1 + \frac{1}{p-1}\right)x + 1 = 0.$$

(*Tedhunter.*)

$$(p-1)^2 x^3 + px^2 + \left(p - 1 + \frac{1}{p-1}\right)x + 1 = 0$$

$$x\left[(p-1)^2 x^2 + px + \frac{1}{p-1}\right] + (p-1)x + 1 = 0$$

$$x\left[(p-1)^2 x^2 - 1 + px + 1 + \frac{1}{p-1}\right] + (p-1)x + 1 = 0$$

$$x\left[(p-1)^2 x^2 - 1 + \frac{p(p-1)x + p}{p-1}\right] + (p-1)x + 1 = 0$$

$$x\left[[(p-1)x + 1][(p-1)x - 1] + \frac{[(p-1)x + 1]p}{p-1}\right] + (p-1)x + 1 = 0$$

$$[(p-1)x + 1]\left[x[(p-1)x - 1] + \frac{px}{p-1} + 1\right] = 0,$$

$$\therefore (p-1)x + 1 = 0$$

or $(p-1)x^2 - x + \frac{px}{p-1} + 1 = 0,$

If $(p-1)x + 1 = 0$

$$(p-1)x = -1$$
$$\therefore x = \frac{1}{1-p}.$$

If $(p-1)x^2 - x + \frac{px}{p-1} + 1 = 0$

$$x^2(p-1) + \frac{px - px + x}{p-1} + 1 = 0$$
$$x^2(p-1) + \frac{x}{p-1} = -1$$
$$x^2 + \frac{x}{(p-1)^2} = -\frac{1}{p-1}$$
$$x^2 + \frac{x}{(p-1)^2} + \left[\frac{1}{2(p-1)^2}\right]^2 = \frac{1}{4(p-1)^4} - \frac{1}{p-1}$$
$$= \frac{1 - 4(p-1)^3}{4(p-1)^4}$$
$$x + \frac{1}{2(p-1)^2} = \frac{\pm\sqrt{1 - 4(p-1)^3}}{2(p-1)^2}$$
$$\therefore x = \frac{\pm\sqrt{1 - 4(p-1)^3} - 1}{2(p-1)^2}.$$

4. SILHOUETTE.—There are 25 couples at a ball. In the company there are 2 brothers and 3 sisters of the same family; 3 brothers of another; 3 couples of sisters and 2 other couples of brothers of families each bearing different names. How many sets of Lancers (8) may be chosen so that: (1) There may not be more than one lady and one gentleman of the same name in each set: (2) These two persons may not belong to the same family: (3) The greatest number of different sets possible may be made?

(*Algebraic Exams. American.*)

(1) The 25 couples may be denoted as under:—*a*, *a*, &c., being persons of the same name and family.

GENTLEMEN.	LADIES.
a, *a*, *b*, *b*, *b*, *c*, *c*, *d*, *d* } Class A	*a*, *a*, *a*, *e*, *e*, *f*, *f*, *g*, *g* } Class A
and 16 others—Class B.	and 16 others—Class B.

(1) To solve the problem, we must find the No. of combinations of 2 *a's*, 3 *b's*, 2 *c's* and 2 *d's*—taken (i.) one (ii.) two (iii.) three and (iv.) four together, so that there are not 2 *a's*, nor 2 *b's*, nor 2 *c's*, nor 2 *d's* in the same combination.

(i.) Taken one together, there are 9.

(ii.) Taken two together :—
Of the *c's* and *d's* there are 2×2 or 4,
Of the *b's*, *c's* and *d's*, there are $(4 \times 3) + (2 \times 2)$ or 16,
Of the *a's*, *b's*, *c's*, and *d's*, there are $(7 \times 2) + 16$ or 30.

(As a proof of this :—$C_{49} = \frac{9.8}{1.2}$ or 36; but of these, 1 would contain two *a's*, 1 two *c's*, 1 two *d's*, and 3 two *b's*; ∴ No. would be $36 - 6$ or 30.)

(iii.) Taken three together :—
Of the *b's*, *c's*, and *d's*, there are 4×3 or 12,
Of the *a's*, *b's*, *c's*, and *d's*, there are $16 \times 2 + 12$ or 44.

(iv.) Taken four together, there are 12×2 or 24.
The possible combinations of four

With none of Class A is $\frac{16.15.14.13}{\lfloor 4}$ or 1,820;
,, one ,, ,, $\frac{16.15.14}{\lfloor 3} \times 9$ or 5,040;
,, two ,, ,, $\frac{16.15}{\lfloor 2} \times 30$ or 3,600;
,, three ,, ,, 16×44 or 704;
,, four ,, ,, 24.

∴ Entire No. of sets of four gentlemen which can be made with the 25, subject to the condition stated, is

1,820 + 5,040 + 3,600 + 704 + 24 or 11,188.

Since the 25 ladies are separated into families in the same way as the gentlemen, there are as many possible sets of four of them as of the gentlemen, and each set of the one could dance with each set of the other.

Hence the No. of possible sets = $(11,188)^2$. Ans.

(2) With regard to this condition, if we remove the two *a's* from the gentlemen, arguing as before.

The possible combinations of four gentlemen

With none of Class A is $\frac{16.15.14.13}{\lfloor 4}$ or 1,820;
,, one ,, ,, $\frac{16.15.14}{\lfloor 3} \times 7$ or 3,920;
,, two ,, ,, $\frac{16.15}{\lfloor 2} \times 16$ or 1,920;
,, three ,, ,, 16×12 or 192.

∴ Entire No. of sets of four gentlemen excluding the two gentlemen *a* is

1,820 + 3,920 + 1,920 + 192 or 7,852;

and each of these sets can dance with the sets of ladies as found in first part.

We must now exclude the three ladies *a*, and find the No. of combinations of the 22 left.

These will be

$$\frac{16.15.14.13}{\lfloor 4} + \frac{16.15.14}{\lfloor 3} \times 6 + \frac{16.15}{2} \times 12$$

or 1,920 + 3,360 + 1,440 or 6,720;

and each of these sets can dance with the two gentlemen *a*.

∴ No. of possible sets
$= (7,852 \times 11,188) + (6,720 \times 2)$
$= 87,861,616$. Ans.

(3) The No. of combinations in this case

$$= \left\{ \frac{25.24.23.22}{\lfloor 4} \right\}^2$$

$= (12,650)^2$. Ans.

Certificate Examination, 1888.

Female Candidates.

FIRST YEAR.

Domestic Economy.

THREE *hours allowed for this Paper.*

Candidates are not permitted to answer more than EIGHT questions.

1. Why must food be masticated, and what is to be understood by 'inability to digest' food?

(1) (*a*) In order that food may nourish the body, it must be changed into a fluid, capable of mixing easily with the blood. Preparatory to its fluid state, food requires to be reduced to a pulp before entering the stomach. Accordingly, the teeth break up and grind it, the saliva moistens and softens it, and the tongue conducts it to the throat ready for swallowing and subsequent digesting. *Food must be masticated*, or the stomach receives it in an unprepared state, digestion is painful and difficult, or impossible, and the food thus taken does not yield the adequate amount of nourishment.

(*b*) When food is passed into the stomach it is mixed with *gastric juice* and becomes a fluid called *chyme*. This is further liquified by fluids from the liver, sweetbread, and other small glands in the bowel, and is then called *chyle*, in which form it is absorbed by the *lacteals*, and carried into the blood. By '*inability to digest*' food, we understand that some one or other of these processes is interfered with so that the food is not properly prepared for absorption, and cannot be properly assimilated into the system.

2. Give reasons in favour of a mixed diet.

(2) By a 'mixed diet' is understood a duly proportioned one of animal and vegetable foods.

Animal food is more concentrated and nutritious, is assimilated more easily, but is deficient in starchy materials. Vegetable food contains an excess of starchy and carbonaceous matters, and the nutriment contained is often condensed and difficult of digestion. As food is taken to meet the requirements of the human body, it is necessary that the diet possess all the varied materials.

Professor Huxley gives the following Tables :—

Requirements of an average human body :

	Grs.
Proteids	2,000
Amyloids	4,400
Fats	1,200
Minerals	400
Water	36,500
Total ...	44,500

These might be obtained by :

	Grs.
Lean beef-steaks	5,000
Bread	6,000
Milk	7,000
Potatoes	3,000
Butter, dripping, &c.	600
Water	22,900
Total ...	44,500

Summary.—(*a*) Neither flesh nor vegetable matter contains apart the proper constituents of a true food in proportionate and accessible form.

(*b*) The constitution of man as to teeth, stomach and intestines shows him to be partly carnivorous and partly herbivorous.

(*c*) The human appetite demands variety, and sameness of diet produces disgust and nausea. In the torrid and frigid zones a mixed diet is not so essential; in the former a purely vegetable, and in the latter, a purely animal one may suffice.

3. Compare (*a*) the cost, (*b*) wear, and (*c*) uses, of cotton, linen, silk, and woollen fabrics.

(3) *Cotton.* (*a*) Grey calico, 2½d. to 4d. per yard; white, 4d. to 7d.; sheeting, 1s. 4d.; print, 6d. to 8d.

(*b*) Does not wear so well as linen, but is cheap and easily washed. Grey calico is comfortable and durable, and becomes whiter with washing. The durability of print depends on the washing.

(*c*) For underclothing, bed-linen, dresses and pinafores.

Linen. (*a*) For ordinary purposes, about 1s. 2d. per yard. Linen sheets, from 6s. 6d. per pair. Table-cloths, from 5s. 6d., depending on size and texture. Handkerchiefs, 4s. to 12s. per dozen.

(*b*) Is tough and durable, and maintains its whiteness much better than cotton.

(*c*) Underclothing, but not so warm as cotton. This reason, also, prevents it being so much used for bed-linen as formerly. Mostly used for table-linen, handkerchiefs, napkins, collars, and cuffs, and other similar articles, because of the gloss which can be given to its surface.

Silk. (*a*) Almost any price may be given for silk. Good black dress silk may be obtained for 4s. per yard, but 6s. to 8s. 6d. is not an extraordinary price. Coloured silks, from 2s. 6d. Pongees and Surats from 1s. 6d. Ribbons, 4d. to 1s. 6d., according to width. Kerchiefs from 2s. Gloves, 1s. to 2s. 6d.

(*b*) Can only be regarded as a luxury. Will not stand any rough or everyday wear.

(*c*) For dresses, gloves, ribbons, and trimmings, stockings, neckties, all chiefly ornamental.

Woollen. (*a*) Welsh flannel, 10d. to 1s. 4d. per yard, white, scarlet, or grey. Shirting (union), 11d.; all wool, 1s. 5d.; woollen mixtures for dresses, 10d. to 1s. 4d., single width. Stocking wool, Scotch, 3s. per lb.

(*b*) Depends mostly on washing. Scarlet or grey wears best, as it will not want washing so often. Black wool for stockings, and grey colours for shirting wear best.

(*c*) For petticoats, blankets, stockings, vests, shirts, wraps. Knitted woollen vests are best to wear next the body as they prevent chills and help to keep up the circulation. Flanelette makes cheap and useful nightdresses for children, also tennis dresses, and other garments.

4. Explain the different processes of washing—(*a*) a calico shirt; (*b*) a flannel dressing-gown, and (*c*) a print dress, respectively.

(4) (*a*) Place *calico shirt* in cold water with a tablespoonful of Hudson's soap powder, and soak all night. Next day wring out, and rub well in hot water with soap or powder or turn in washing machine in a good lather; check boiling, place in copper, and boil about 20 minutes, using soap or powder. Rinse through hot, then through cold blue water. Dry in open air if possible, or bleach on grass. [*A much easier method of washing* all ordinary linen is obtaining. Cut up ½ lb. soap into 3 buckets water, allow soap to dissolve, and water to boil. Pour in 1 tablespoonful of petroleum; check boiling, then, having divided the clothes into heaps, put in the cleanest, and boil for 2 hours, STIRRING frequently. All that is required in addition is to use plenty of water in the rinsing to destroy odour of petroleum. No soaking, no rubbing, quite 70 per cent. of labour saved, and the clothes keep a beautiful colour.]

(*b*) *Flannel dressing-gown.*—Requirements: Cool water, soap jelly. All the water used, including the rinsing water, should be about the same temperature, neither *hot*, nor *cold*. Soap must not be rubbed on. Well rub in two lathers, first on one side, then the other, and rinse well in clean warm water to get out soap. Dry as quickly as possible in the open air. Much shrinking may be prevented by occasionally stretching and pulling out, while drying.

(*c*) *Print dress.*—This must be washed in as cool a water as will remove the dirt, and as quickly as possible. Wash in two waters, using nothing else but soap. In the rinsing water, dissolve 1 teaspoonful of powdered alum. This is superior to salt for maintaining and freshening the colours. Starch at once in boiled starch, which has gone cool. Dry outside in the shade. Must not be soaked or boiled.

5. Give a list of the articles (with approximate cost of each) for comfortably furnishing a working man's cottage.

(5)

PARLOUR.

	£	s.	d.
Square of cocoa or string matting	0	12	0
Hearth-rug (cloth)	0	5	6
Round table, deal top	0	15	0
Table-cloth	0	2	6
4 chairs	0	14	0
Arm-chair, sofa	1	10	0
Fender and irons	0	7	6
Blind, &c.	0	5	0
Bookshelves	0	7	6
Total	£4	19	0

KITCHEN.

	£	s.	d.
Deal table	0	10	0
2 chairs	0	8	0
Fender and irons	0	7	0
Total	£1	5	0

BED-ROOM.

	£	s.	d.
Iron bedstead and mattress	1	1	0
Wool or hair mattress	0	15	0
Bolster and pillows	0	5	6
3 blankets	0	17	6
Counterpane	0	4	6
Dressing-table and wash-stand	0	18	6
Drawers	0	15	0
Carpet, 3 yards at 1s.	0	3	0
Looking-glass	0	4	0
2 chairs	0	7	0
Blind, &c.	0	4	0
Toilet ware	0	5	6
Dressing table requirements	0	2	0
Total	£6	2	6

Glass, Ironmongery and Earthenware.

	£	s.	d.
½ doz. knifes and forks, 4s. 6d.; 2 table spoons, 1s.; 4 dessert, 1s. 4d.; 6 tea-spoons, 1s. 6d.; 1 iron spoon, 6d.; mustard and salt spoons, 4d.	0	9	2
Coffee-pot, 10d.; teapot, 1s.; trays, 1s. 6d.; frying-pan, 8d.; gridiron, 8d.; 3 sauce-pans, 3s. 2d.; pot, 2s. 6d.	0	10	4
2 buckets, 1s. 8d.; tea-kettle, 3s.; slop-pail, 2s.; candlesticks, 1s. 6d.; washing-pans, 3s. 6d.; brushes (scrubbing), 11d.	0	12	7
3 boot brushes, 2s.; 3 blacklead, 2s.; 2 flat-irons and stand, 2s.; coal-scuttle, 2s.; paste-board and pin, 1s. 6d.	0	9	6
Shovel, 1s.; dust-pan, 8d.; 2 baking-pans, 1s.; knife-board, 6d.; carpet and hearth-brush, 1s. 2d.; 2 brooms, 2s. 6d.	0	6	10
Breakfast crockery, 3s.; dinner ditto, 6s.; basins, dishes, &c., 4s.; 6 tumblers, 1s.; Jugs, 1s. 3d.	0	15	3
Total	£3	3	8

	£	s.	d.
Parlour	4	19	0
Bedroom	6	2	6
Kitchen	1	5	0
Utensils	3	3	8
Total	£15	10	2

Note.—One bed-room only is furnished. If the family requires more, the one given will be similar.

[The above answer is given in more detail than the examination paper would probably afford room for; in that case the utensils must be given under more comprehensive heads. The particulars are inserted for the instruction of the student.]

6. Explain what is meant by 'inspiration' and 'respiration.' Describe the uses of these two processes, and the organs concerned in performing them.

(6) '*Inspiration*,' or inhalation, is simply 'breathing in'; 'expiration' is 'breathing out,' and *respiration* is the term for both processes.

'*Inspiration*' is for the purpose of oxygenising the blood; *expiration*, to expel waste products. As the blood circulates from the lungs throughout the body, it not only supplies nourishment, but also acts as a drainage system; its inflowing impurities being removed by expiration. The matter expelled is chiefly (*a*) carbonic acid gas; (*b*) watery vapour; and (*c*) decaying tissue, the matter absorbed being principally oxygen.

An average man inspires 30 cubic inches of air fourteen times a minute, which quantity, roughly speaking, loses 5 per cent. of oxygen and gains 5 per cent. of carbonic acid gas before expiration. In 24 hours about 8 oz. of pure charcoal would be expired. The human body is a kind of stove, the oxygen supporting the combustion, the carbonic acid gas being the residual. The chief organ of respiration is *the lungs*, situated in the hollow part of the chest. They are elastic and spongy,

and consist of an innumerable multitude of little cells containing vitiated blood, which is purified by the oxygen of air permeating and being absorbed through the delicate cellular tissue, whilst the carbonic acid gas is given off. The air is conveyed to and from the lungs by the *bronchial tubes*, which bifurcate from the *trachea*, or *wind-pipe*, and then ramify into smaller and smaller tubes until they terminate in air cells, placed contiguous to the blood-cells of the lungs. Unlike the action of the heart, the process of respiration is partially subject to the will, *and indeed breathing may be much improved by practice.*

7. Name the chief considerations, under the heads, Foundation, Site, Light, and Draining, which ought to be kept in view in building a house.

(7) (*a*) In building a house, the character of the *foundation* partly depends upon the nature of the ground. It should, however, be abundantly strong (often concrete is required,) and non-porous to prevent wall-dampness by capillary attraction.

(*b*) The *site* should have a S. or S.W. aspect; be not placed too near trees, marshy ground, graveyards, or objectional manufactories. If of clay, the draining will require particular attention. It should be of ample area.

(*c*) Every house, for health and cheerfulness' sake, requires plenty of *light*. The windows should be numerous, large-paned, and if possible on two sides of the room. They should not face to the North. Light colouring and green blinds are important aids.

(*d*) The *draining* should be effected by large pipes, having no sudden bends; should be independent, well ventilated and well trapped on the syphon system.

8. Give, naming the exact proportions, the constituents of atmospheric air, and explain the separate use of each of them.

(8) A. *Atmospheric air* consists of two principal gases, mechanically mixed, *Oxygen* and *Nitrogen*. The former constitutes about 77·5 per cent. and the latter about 21 per cent. of its bulk. In addition to these are *Carbonic acid*, about ·08 and *watery vapour* 1·42. Traces of *Ammonia*, and in towns *sulphuretted hydrogen* and *sulphurous acid gas*, are always to be found, and after a thunderstorm, *nitric acid*.

B. (*a*) *Oxygen* supports combustion and life, purifies the blood, and by uniting with a portion of the food, keeps up the natural warmth of the body. Inhalation of oxygen alone would soon produce fever, premature old age, and death.

(*b*) *Nitrogen* seems to be used chiefly to dilute the oxygen, and by rendering it less active and exciting to the system, makes it more fit for breathing. It is not a poisonous gas, but has not the power alone of sustaining animal life.

(*c*) *Carbonic acid* is poisonous to animal life but is necessary for the support of plants.

(*d*) *Watery vapour* keeps the air moist. Too dry an atmosphere is injurious both to animals and plants.

After the two principal gases the remaining constituents of the atmosphere are reckoned impurities. Except the moisture, and perhaps nitric acid, all of them are deleterious.

9. What is the difference between arterial and venous blood? Explain why the circulation of the blood is needed to maintain the health of the body and by what habits or acts such circulation is promoted or hindered.

(9) (*a*) *Arterial blood* flows *from* the heart, is of a bright scarlet colour, contains 10 per cent. of oxygen and 20 per cent. of carbonic acid. It is also more watery, fatty, and perhaps fibrinous than *venous blood*. This latter flows *to* the heart, is of a purplish hue, contains 5 per cent of oxygen, and 25 per cent of Nitrogen, besides a considerable quantity of decomposed matter.

(*b*) Every movement of the body, whether automatic or directed by the will, generates heat and produces carbon. By this the blood is vitiated, oxygen being abstracted and carbonic acid substituted. Also, the tissues would not liberate the carbon unless a due proportion of oxygen be present in the blood; neither will the chemical changes necessary to maintain the vital heat take place in its absence.

Almost the only supply of oxygen is obtained through its absorption by the pulmonary blood which without circulation would soon become saturated, whilst the supply of oxygen would be purely local.

(*c*) The circulation is promoted by training the respiration, living a temperate life, keeping the extremities warm, and by moderate exercise. It is impeded by fatigue, gluttony, tightness of clothing, and constrained positions.

10. Classify the several kinds of vegetable substances used as food. Take any three of such substances, describe their composition and the way in which they serve to nourish the body.

(10) Food furnishes to the body materials for:—

A. (*a*) Keeping up the natural warmth, supplied in vegetables by starch, sugar, &c., from the cereals.

(*b*) Producing strength:—Legumin, from peas, beans, &c.

(*c*) Replacing waste and building up frame:—Gluten in wheat.

To these may be added—

(*d*) Antiscorbutics, found in fresh vegetables, and

(*e*) Blood purifying substances, also in vegetables and fruits.

B. (*a*) Wheat is one of the most nutritious of all corn plants. It contains 12 per cent. of flesh-forming substances. As flour, the flesh-forming materials are found in the *gluten;* warmth-producing in the starch; fat, oil, and a high proportion of bone-making and nutritive materials in the middlings.

(*b*) *Legumin* is very similar in its nutritive properties to the dry curd of milk. It forms about a fourth of the weight of dried peas, beans, haricots, lentils, &c.; they are therefore more nutritious and flesh-forming than any other vegetable substances. They contain less starch than grain and are deficient in oil or fat. They are not so easily digested as the cereal grains, therefore require thorough cooking, but to hearty individuals they form an excellent diet for sustaining muscular exertion.

(*c*) The *potato* has ¾ of its weight water, the remainder principally starch. Its nutritive qualities are small and it is not alone well calculated to support life. It is valuable chiefly for the saline substances it contains, which make it a powerful preventive of scurvy. It also contains medicinal properties. Potato-starch is often substituted for arrowroot, and the potato is also a useful addition in bread making.

11. What are condiments? Name four of those in most general use. Say whence they are obtained, and what purpose they serve.

(11) A. *Condiments* are substances employed to season and render food more palatable, to make it digestible and to stimulate the stomach to increased action.

B. (*a*) *Salt* is found in solid masses, beds, or strata, in many parts of the world. The most important British mines are in Cheshire. Sea water usually contains about 3 per cent., and it is also obtained from salt springs. Salt is composed of hydrochloric acid and soda (Na Cl) both of which ingredients are necessary to the right performance of the process of digestion. The acid is required by the digestive fluid of the stomach, and the soda for the formation of bile, which must be added to the dissolved food before nourishment can be taken from it. One quarter to half an ounce daily should be taken by an adult. It preserves meat, fish, and vegetables, and is a radical cure for worms.

(*b*) *Vinegar* is made from malt and water, boiled, fermented with yeast, and allowed to turn sour. It retards, and even prevents entirely, the putrefaction of animal and vegetable substances; is therefore used for pickling. It allays thirst, cools the system, and, if not taken too freely, assists digestion. It is used in cooking to soften fibres of flesh, rendering meat easy to digest.

(*c*) *Mustard* is the ground seeds of the mustard plant. Contains a volatile acrid oil which is developed in it when mixed with water. As a condiment it promotes appetite and quickens digestion. Used as a plaster, it is a counter-irritant and relieves pain. It is also used as an emetic.

(*d*) *Pepper* is obtained from the pepper plant. When the berry is ground entire, it becomes black pepper, and when the husk is first removed, we have white pepper, It contains an oil more acrid and irritant than that of mustard. It is used as a seasoning, and also taken with articles difficult of digestion, as cucumber, &c., to stimulate the stomach to the increased action requisite.

12. Give a list of all the articles which should be found in a well furnished laundry, and name the prices of the various substances to be used in washing. Mention the same precautions which are needed in the use of any of these substances.

(12) A. *A laundry* should consist of—(*a*) *A wash-house*. This should be detached from the kitchen and have a funnel or shaft to carry off the steam. Should be large and commodious, have a stone floor with good drainage and sloping to gutter. The wash-house must contain boiler and furnace, washing machine, tubs furnished with taps for hot and cold water, also one at the bottom to communicate with drain. The tubs should be arranged sloping to the light and at a convenient height for use.

(*b*) An ironing and drying room. Articles required here are—ironing table, long and strong, with drawers for blankets, &c.; ironing boards, mangle, cupboards; flat, box, and gophering irons; hot plate in chimney for heating irons; clothes horses and drying poles suspended from ceiling. In large laundries, a drying closet is also added, heated by furnaces and flues.

B. Substances used in washing comprise, soap, 3d. per lb.; soda, ½d. per lb.; soap powder, 3d. per lb.; Borax, 8d. per lb.; chloride of lime, ½d. per lb.; starch, 5d. per lb.; and paraffin oil, 2½d. per qt. Pearlash, lye, salt, and alum, are also used.

C. *Water* should be soft. Yellow or white *soap* only should be used for delicate fabrics. *Soap powder* and *soda* will injure colours. *Chloride of lime* is used to bleach, but destroys clothes if used often or largely. In using *paraffin or paraffin soap*, precaution must be taken to rinse well and use plenty of water to prevent smell. *Salt* and *alum* are preventive substances to preserve colours. In large town laundries, vegetable *fibre brushes* are used to remove obstinate dirt from coarse articles, but constant use of them is very destructive.

Female Candidates.

SECOND YEAR.

Geography.

(THREE *hours allowed for this Paper.*)

No candidate is permitted to answer more than EIGHT questions.

1. Describe the forms of Government existing in any two of our most important Colonies and dependencies, and explain how these governments are subordinated to the Home Government?

(1) The Government of the Dominion of Canada is twofold, consisting of—(1) The Federal Legislature, (2) Provincial Governments. The *Federal Legislature* is seated at Ottawa and consists of a Governor General, who is appointed by the English Sovereign and who holds office for a period not exceeding five years. He is assisted by a senate of 75 members, who are appointed for life and nominated by the Crown. Besides the Governor General and the Senate, is a House of Commons, at present consisting of 206 members elected by the people. The Ministry for the time being is composed of members of the House of Commons and the Senate. Like the English Cabinet they are entrusted with the administration of the several departments of government. The Premier, who presides over the Ministry, is appointed by the Crown after the choice of the people has been ascertained. As in England, before any measure can become law it must receive the concurrence of the Governor General representing the Sovereign, the Senate and the House of Commons. The *Provincial Governments* have the control of the local affairs of each province of the Dominion. Over each province a Lieutenant Governor is appointed by the Governor General; he is assisted in most of the provinces by a Legislative Council appointed for life and a Legislative Assembly popularly elected. Each province has also its Ministry resembling that of the Federal Legislature. *How these are subordinated to the Home Government.* In the first place the Governor General, the Federal Senate and the Premier of the Federal Legislature are appointed by the English Crown, and in the second place the Governor General has power to disallow Acts of the Provincial Governments within one year of their enactment, and further, the Home Government has power to disallow any enactment of the Dominion Legislature within two years after its adoption.

Hindostan is the most important British Dependency. Its subordination to the Home Government is very close, as will be seen from the following statement.—In 1858 an Act for the better Government of India was passed, by which all the territories under the Government of the East India Company were transferred to the English Crown, and all the powers of government then held by the East India Company were transferred to a Secretary of State for India. In the year 1877 the Queen of England assumed the title of Empress of India.

At present the rule of India is twofold. *In England* the Secretary of State for India is assisted by a council of fifteen members, seven of whom were chosen by the East India Company and the remainder by the English Government. *In India* the Viceroy is appointed by the Crown for a period of five years. He is assisted by an executive council of six members who form the Supreme Government of India. Each member of the council, besides sharing the responsibility of Supreme Government, is head of a special department, of which there are six, viz., Foreign, Finance and Commerce, Military, Public Works, Home, and Revenue and Agriculture.

Besides the Supreme Government in Calcutta, India is divided into nine separate provinces, each having its own civil government, subordinate however to the Viceroy and his council. The following are the provinces:—**Bengal**, Lieutenant Governor; **N. W. Province**, Lieutenant Governor; **Central Provinces**, Chief Commissioner; **Punjaub**, Lieutenant Governor; **British Burmah**, Chief Commissioner; **Madras**, Governor; **Bombay**, Governor; **Assam**, Chief Commissioner. Under Lord Lytton a system of Indian municipalities with popular and local government was developed and is still upon its trial.

2. What remarkable physical features are to be found in Trinidad, New Zealand, and Canada? Give a brief description of the physical features and natural productions of either the Cape Colony or India.

(2) Remarkable physical features:—

1. In Trinidad. An enormous asphalte lake, 90 acres in extent and a source of great wealth.

2. New Zealand. The hot lakes, mud volcanoes, and springs like the geysers of Iceland. These are found in the valleys of the Maketu and Mataba. Marvellous activity of these volcanic phenomena has been manifest in recent years.

3. Canada. The great lakes which separate for a considerable distance the Dominion from the United States and which constitute the largest body of fresh water in the globe. Associated with these are the wonderful Falls of Niagara.

Physical features and natural productions of Cape Colony.

1. Physical features:—The surface contour presents a series of terraces rising gradually from the sea to the interior. These are separated from each other by mountain ranges. The first of the terraces forms a maritime belt in the south, of great fertility; the second terrace is about thirty miles broad and in its western part is called Kannaland; the third terrace, the great Karroo, is the largest, being about 100 miles broad and from 3000 ft. to 4000 ft. above the sea level.

Separating these terraces are the following ranges of hills:—

1. **The Coast Range** running parallel to the coast from the N. of Cape Town towards Natal. It is variously named in different parts—Olifant mountains, Lange Bergen and Outeniqua Range.

2. The second range is higher than the Coast Range and receives the following names:—Bokkeveldt, Witt Bergen, and Zwarte Bergen.

3. The highest range of mountains in the entire colony is the one forming the limit to the Great Karroo. It receives the following names—Roggeveldt, Nienwveldt, Sneeuw Bergen, Storm Bergen, and Draken Berg or Quathlamba.

The largest rivers flow for the most part in an East and West direction; they are the Orange river with its tributaries the Ongar and Zak on the left bank, and the Ky or Vaal river, the Great Fish river, and the Olifant river on the right bank.

Smaller rivers flowing towards the South are the Breede, Gawritz, Sunday and Great Fish. The Keiskamma and Kei are important rivers in the South East.

2. Natural Productions. The chief vegetable productions are wheat and maize on the higher terrace. Fruits (for wine), tobacco, flax, some cotton and timber are also grown. The animal productions are sheep and cattle, producing large supplies of wool, hides and preserved meat. The ostrich is reared for feathers. Copper, gold and diamonds constitute the chief mineral wealth of the colony.

3. In what parts of the world have we acquired territory during the last ten years? Give a short account of our acquisition of Burmah.

(3) 1. Acquisitions in and near the Red Sea. These are Suakim, with a protectorate over Suez and adjoining Egyptian coast; Socotra, and the Somali coast.

2. In the Straits Settlements places of minor importance have been acquired.

3. In South Africa W. Griqualand was annexed in 1880, and the Niger Protectorate was assumed in 1884.

4. In the Western Pacific, besides a portion of New Guinea and Borneo, several small islands off the East Coast of Australia.

5. Cyprus in 1878.

6. The Burmese Empire was annexed by Proclamation dated Jan. 1st, 1886. A quarrel first arose between the King of Burmah and the Bombay and Burmah Trading Company respecting their supplies of teak. The King confiscated the property of the Company and murdered some of its servants. The English army invaded King Theebaw's territory, and in November, 1885, captured Mandalay, the capital.

4. Which of our colonies afford good openings (1) for persons of both sexes capable of hard manual labour, (2) for families desirous of getting a grant of land and farming? Compare the conditions of life in New Zealand or Manitoba with those in the mother country.

(4) 1. The various provinces of the Dominion, Cape Colony, Australia and New Zealand.

2. Manitoba and other provinces in the Dominion, Queensland, New Zealand and Tasmania.

3. Conditions of life in Manitoba and England.—In Manitoba nearly the entire population is engaged in farming, and as labour is both scarce and dear, a settler and his family will have to cultivate their farm themselves. This will necessitate much rough and hard work. As the population is scanty the opportunities for social intercourse will be rare. Life will soon become monotonous, and unless a more than usual amount of patience and perseverance manifest themselves it may become intolerable. The prospect, however (after the first few years of a settler's life have been successfully passed), of becoming the proprietor of a large and prosperous farm, with increasing comforts as years advance, crowned with the hope of an independent old age, is sufficient stimulus for many to undergo the trials of the first years of a settler's existence. Life in England presents many contrasts with that in Manitoba. Land is much dearer; smaller holdings are alone open to the limited capitalist. A greater variety of occupation is open to his family; more comforts are attainable; at the same time the struggle for existence is more severe than in Manitoba, and the prospects of raising the condition of earlier days are fewer.

5. Describe the Sea Routes to Honduras, Quebec, the Mauritius, Vancouver's Isle, Galle, and Hong Kong, giving approximately their respective distances from London, and the time the voyage would take in each case.

(5) *To Honduras.* The sea route is by mail steamer. Across the Atlantic to New Orleans, from London or Southampton. From thence steamers leave direct for Belize, the time being four days from Orleans and about two and a half weeks from home. Distance about 5,000 miles.

To Quebec from Liverpool, across the Atlantic and through the St. of Belle Isle; the distance is 2,500 miles and the time about nine days.

The Mauritius. Once in four weeks the Castle Line of steamers leaving London and Dartmouth for the Cape, calling at Madeira *en route*, proceed *viâ* Natal to Port Louis; the passage occupies nearly a month. If the journey be taken *viâ* Marseilles and the Suez Canal by the mail steamers of the Messageries Maritimes, the passage is made in 21 days. Distance by the latter route about 6000 miles.

To Vancouver's Isle. The sea voyage is made *viâ* Rio, Cape Horn and San Francisco, and is not less than 15,000 miles, and would occupy at least 50 days.

To Gallé viâ the Mediterranean, Suez Canal, Red Sea, and Arabian Sea, to Gallé. The distance from London is 6,500 miles. Time 21 days.

To Hong Kong the same route would be followed as far as Gallé; thence to Hong Kong is 3000 miles; and the extension of time required would amount to about 10 days.

6. From which of our Colonies do we obtain (1) the Raw Materials we use in Textile Fabrics, (2) Precious Minerals and Stones, (3) Articles of Food? What do we send out in return?

(6) *1. Textile Fabrics.*

(*a*) Cotton from India, Egypt, Natal (small amount), West Indies.

(*b*) Wool from Australia, Cape Colony, Natal, and New Zealand, India, Canada.

(*c*) Flax: Canada, New Zealand, Cape Colony.

(*d*) Jute from India.

(*e*) Silk: India.

2. Precious Minerals and Stones.

(*a*) Gold from Australia, Cape Colony, New Zealand, and British Columbia.

(*b*) Silver: New Zealand, British Columbia, Canada.

(*c*) Copper: South Australia, Cape Colony, New Zealand, and Canada.

(*d*) Diamonds: Cape Colony and India.

3. Articles of food: Australia, Canada, Cape Colony, India, New Zealand, West Indies, East Indian Possessions.

4. Sent in return, cotton goods, woollen goods, iron, cutlery, tools, machinery, coal, leathern goods, saddlery, &c.

7. 'It is thought necessary, for the security of the Empire, that we should maintain certain ports, harbours, coaling stations, and "places of arms" at considerable cost.' Name some of these, and mention their special uses.

(7) 1. **Gibraltar,** on the south of Spain, and at the entrance to the Mediterranean, is a strongly fortified town. Large stores of coal are kept for the use of our 'men-of-war' steamers.

2. **Malta** possesses a splendid harbour for the largest war ships. The Mediterranean fleet finds here an ample supply of coal; a large reserve of soldiers and arms are kept in readiness for any emergency.

3. **Cyprus** was acquired in 1878 by England in order to enable us to have fuller command of the eastern portion of the Mediterranean, especially in view of the occupation of Kars by the Russians. Upon the evacuation of Kars and other places in Asia Minor by the Russians, the English engage to leave Cyprus.

4. **Aden** is strongly fortified, and is also a coaling station.

5. **Hong Kong** is becoming as important a stronghold at the entrance to the Chinese Sea as Gibraltar is at the entrance of the Mediterranean. It is mainly held for the protection of our immense commerce in these waters.

6. **Singapore** commands the entrance to the Straits of Malacca, is a position of great importance in time of war, and is being extensively fortified.

7. **Halifax,** in Nova Scotia, is the chief naval harbour for English shipping on the American sea-board. It is a coaling station, and has extensive dockyards.

8. Give a list, in order of importance, of our Possessions on the shore of the Atlantic.

(8) *Possessions on the shores of the Atlantic.*

1. The Dominion.	6. Newfoundland.	11. Bahamas.
2. Cape Colony.	7. Smaller W. Indies.	12. Lagos.
3. Gibraltar.	8. Gold Coast.	13. Niger Protectorate.
4. Jamaica.	9. Honduras.	14. British Sherbro.
5. British Guiana.	10. Gambia.	15. Falkland Isles.

9. Give a short account of the Dominion of Canada under the following heads: (a) Physical Features, (b) Internal Means of Communication, (c) Distribution of Population and its Occupations.

THE DOMINION OF CANADA.

(9) **Physical Features.**

1. *Position and Extent.*

The area comprised within the Dominion of Canada extends across the northern portion of the continent of N. America from east to west, and stretches from the great lakes and the 49th parallel on the south to the Arctic Ocean on the north. The entire area is about 3½ millions of square miles.

2. *Surface Aspects and Drainage.*

The highest land is in the west where the Rocky Mountains reach the snow line. From these heights a short slope towards the Pacific is drained by the Fraser River, the Simpson and the Columbia. The longer slopes stretch from the Rocky Mountains eastward towards the Atlantic, and northward towards the Arctic Ocean. The former of these slopes is drained by the St. Lawrence with its system of lakes (Superior, Erie and Ontario), and the following tributaries: Severn, Thames, Trent, Ottawa, St. Maurice, Montmorency, Saguenay, Richelieu, St. Francis and Chandière. The northern slope is drained by the Mackenzie, the Saskatchewan, Severn, Nelson and Churchill.

The coast line is very extensive and contains large openings, such as Mouth of the St. Lawrence, Davis Strait, Hudson's Bay and Queen Charlotte's Sound. Except for the fisheries on the Eastern shores, the coast line presents no valuable features.

(*b*) **Internal means of communication.**

The coast line is not of much service for commerce, hence the need for developing the water navigation of the interior. The St. Lawrence and its system of canals, almost 100 miles in length, including the **Welland** (joining Erie, with Ontario) and the **Rideau** (joining Ottawa with the lakes), forms a splendid water-way from the Atlantic to the head of Lake Superior. Besides the water navigation just mentioned, the following railways aid communication:—

1. The **Canadian Pacific,** 3,000 miles in length, forming a communication from the Altantic to the Pacific at Vancouver.

2. The **Grand Trunk Railway,** 2,500 miles in length.

3. **Intercolonial Railway,** 800 miles. **New Brunswick** and **Canada.** The Northern of Canada, &c.

(c) **Distribution of Population and its occupation.**
The total population exceeds 4,000,000. Of these the inhabitants of Quebec are largely French, those of Nova Scotia are Scotch, whilst English, Irish and Germans are distributed over the remaining provinces. The area most densely populated is Ontario, where at least one half of the entire community are found. In Manitoba and the N.W. Territory, the population is very scattered. Agriculture is the chief occupation. The growing of corn, sheep and cattle rearing and lumbering are the occupations of the more settled regions. Manufactures, such as sugar refining and cotton spinning, are being introduced into the towns; the fur trade, mining and fishing are occupations in the less settled districts.

10. *Write what you know about six of the following: New Westminster, Rangoon, Kimberley, Toronto, Penang, Athabasca, Bathurst, Bechuanaland, George Town, Socotra, Pegu.*

(10) **New Westminster,** an important town in British Columbia and situated near the mouth of the Fraser River.
Rangoon, the capital of British Burmah and situated on one of the mouths of the Irawaddy. Its position is low and very unhealthy for Europeans. The means of communication with the interior, by water and road, are good, hence it is the chief outlet for the rice, indigo and cotton which the district yields.
Kimberley is the chief town in the Diamond Field, north of Cape Colony. In 1885, diamonds were sent from Kimberley valued at £2,490,000. A railway joins the town to the capital of the colony, a distance of 31 hours' ride.
Toronto, on Lake Ontario, has a population of nearly 100,000. It is one of the finest towns in the Dominion and was formerly one of the capitals of Canada. It is also a famous railway centre.
Penang on Prince of Wales Island, is situated at the entrance of the Malacca Strait. Its chief town is George Town. With a hot climate and fertile soil, it produces rice, sugar and fruits.
Athabasca, a river in the N.W. Territory of the Dominion.

11. *In what parts of the British Empire are the following Tribes and Peoples to be found: Ghoorkas, Zulus, Negroes, Tamils, Kaffirs, Maoris, Malays and Chinese? Give their distinguishing characteristics.*

(11). **Ghoorkas.** India.
Zulus. In South Africa.
Negroes. Sierra Leone, Niger Protectorate, Jamaica.
Tamils. Ceylon.
Kaffirs. In Cape Colony and Natal.
Maoris. In New Zealand.
Malays. Straits Settlements, Ceylon.
Chinese. Hong Kong, Straits Settlements and Queensland.

Female Candidates.

FIRST YEAR.

Geography.

(THREE *hours allowed for this Paper.*)

Candidates may answer only THREE *of the first* FIVE, *and only* FOUR *other questions.*

Small sketch maps or diagrams may be drawn to illustrate any answer, at the candidate's discretion.

1. *What are the principal motions of the earth? Explain how it is that varying seasons and days and nights of unequal duration are caused by the plane of the equator being inclined to the ecliptic.*

(1) **The Motions of the Earth:**
1. The rotatory motion of the earth upon a supposed axis, causing the alternation of Day and Night in all latitudes between the Arctic and Antarctic circles.
2. The revolution of the earth in its orbit round the sun, causing the recurrence of the 'Seasons.'
3. The slight rolling of the earth's axis causing the 'Precession of the Equinoxes.'
4. The oscillation of the axis, causing the phenomena termed 'Nutation.'

The varying Seasons and unequal days and nights.
On account of the earth's axis being inclined 23½° from the plane of the Ecliptic, and further because the axis maintains a constant direction in space, the entire area round the North Pole as far as the Arctic circle is entirely within the light at our Midsummer; at the same time the area within the Antarctic circle is entirely in the dark; between these two extremes the length of day varies so that from the Equator northwards the day increases in length as we proceed towards the Arctic circle, whilst southwards from the Equator the day decreases in length as we proceed towards the Antarctic circle. Joined to this variation in the length of the day, the height of the sun at midday is found to vary, so that with a long day in the northern hemisphere the sun also rises to a greater height than at any other period of the year. These two conditions therefore, viz., a long day and a high sun, cause the summer at the time of the year in the northern hemisphere, and the short day with the low elevation of the sun causes the winter of the southern hemisphere. In six months' time these conditions are entirely reversed, and then the northern hemisphere has shorter days and a sun at a less elevation and hence winter, whilst the southern hemisphere at this time experiences summer conditions.

2. *How far does the atmosphere extend, and of what gases is it composed? Explain the term rarefaction. Why are we not crushed by the weight of the atmosphere? Explain the following lines from Shelley's 'Cloud':—*

'I am the daughter of earth and water,
And the nursling of the sky;
I pass through the pores of the ocean and shores,
I change, but I cannot die.'

(2) (*a*) The atmosphere is supposed to extend to a distance of 200 miles above the earth's surface. The greater portion, however, is condensed within the five miles nearest the earth. The gases of which it is composed are Oxygen and Nitrogen, with very small amounts of Aqueous Vapour and Carbonic Acid Gas.
(*b*) The term '*rarefaction*' may be explained by taking a small bladder half filled with air; when this is heated it gradually expands and soon fills out the bladder. As there has been no air enter, it follows that the air within when heated fills more space than before: it is said to be rarefied.
(*c*) We are not crushed by the weight of the atmosphere because the various organs of the body are subject to an equal pressure within, and this balances therefore the pressure of the air without.
(*d*) Clouds are formed from the vapour in the air by a process of condensation, the vapour, however, was first obtained from the surface of water areas existing on the earth, hence the cloud is said to be 'daughter of earth and water.' The atmosphere, however, is necessary for maintaining the vapour until, by condensation, it is changed to cloud; hence it may be called 'the nursling of the sky.' The vapour passes invisibly from the surface of water and enters into the interspaces between molecules of air, and throughout the whole series of changes from ocean water to invisible vapour, then to cloud and finally to rain, nothing is lost; there is only a change of condition.

3. *How do you account for the inequality of the heights to which the tides rise in different places? Explain how hot, cold, and under- or counter-currents are caused. What currents would you meet with off the coast of Japan, the North Cape, and the South Coast of Africa?*

(3) (*a*) The tide rises 60 feet in the Bay of Fundy, 45 feet in Bristol Channel, 24 feet in the Wash, and only a few feet off the west coast of Cornwall. How are these inequalities accounted for? The answer to this question is to be sought in the particular form of the tidal opening. The Bristol Channel on the east of the Atlantic, and the Bay of Fundy on the west, are both well exposed to the direct progress of the Atlantic tidal wave. Their shores gradually approach each other, and as the wave of moderate height proceeds up these funnel-shaped estuaries, what it loses in width it gains in height, and thus, after proceeding a considerable distance between these constantly approaching shores, it rises to an abnormal height. Along the west coast of Cornwall, on the other hand, there are no openings of the shape represented by the Bristol Channel, hence the tidal wave does not rise very high.
(*b*) When water is chilled it becomes heavier than water moderately warm, and in consequence of its greater density it sinks, and the warmer water near overflows the colder water, thus we have an under-current of cold and heavier water and a surface current of the warmer water. We see the surface current and are apt to suppose that it is the chief and primary movement of water; the cold counter-current, however, is the first to move and the surface current is an effect following upon the movement of

the deeper current. The cold water of Arctic regions moves towards the warmer waters of the Tropics, the tropical waters in turn move over towards the poles; in this way the various oceanic currents not caused immediately by the wind blowing across the surface are caused.

(*c*) *Off Japan* a current of warm equatorial water flows N.E. towards the coast of British Columbia

At the North Cape a somewhat similar current of water flows N.E. in continuation of the Gulf Stream.

Along the South Coast of Africa a rather complex set of currents prevails. Close in shore the current from Madagascar sweeps round the coast towards the Atlantic. Further out at sea a drift current from the Antarctic runs in a N.E. direction and joining the current from South America across the South Atlantic forms the easterly current across the Southern Ocean towards Australia.

4. *The difference between the summer heat and winter cold of Moscow is* 82°, *whilst that of London is* 57°. *How do you account for this? Mention, with instances, the chief causes which determine the climate of a country.*

(4) The climate of Moscow is hot in summer because of the heated condition of the continental mass of land surrounding it. London, on the other hand, remains comparatively cool in consequence of the cooling influence of the surrounding seas and oceans. In the winter when the land is frozen or covered with snow the temperature of Moscow sinks very low indeed, whilst the water near London maintains very nearly the same temperature in winter as in summer, and in consequence the temperature of the air in London does not sink so low as it does in Moscow. The reason for the water keeping nearly the same temperature throughout the year is to be sought in its high specific heat.

The chief causes determining climate are—

1. **Latitude.** The nearer the equator the warmer the climate, hence England is warmer than the north of Scotland or Norway, and Spain is warmer than England.

2. **Altitude.** The temperature rises as we ascend a mountain. Quito is a town situated very nearly at the equator, but in consequence of its great altitude it enjoys a cool climate, and on the summits of the highest peaks of the Andes near Quito snow remains the whole year through.

3. **Prevailing Winds.** An easterly wind in England during the months of spring is dry and cold because it passes over the chilled surface of north Europe; a S.W. wind, on the other hand, is always a warmer wind because it blows over the warm waters of the Atlantic.

4. **Ocean Currents.** The Gulf Stream brings sufficient warmth with it to keep the ports of N.W. Norway open throughout the entire winter, whilst Nain in Labrador, in a similar latitude, is one of the coldest towns known. This is in part due to the Arctic current sweeping along the shore of Labrador.

6. *What bearing has the geographical position of Great Britain had upon the national character, its relation with foreign countries, discoveries, and commerce?*

(6) 1. **National Character.** The insular and isolated position which Britain occupies has tended to keep its inhabitants a distinct people. Since the Norman conquest there has been but little infusion of any foreign element in the race, and the habits and modes of life of the people have very slowly submitted to those changes which have affected whole communities on the continent. Of recent years, owing to the greater facilities for travel, and increasing wealth, the English have mixed much more freely with continental nations, with a corresponding tendency to adopt some of their manners and customs. Still, in the modes of home life, in the relationships existing between people in different stations, in their employment, in their moral and religious life, and especially in their civil and religious freedom, the inhabitants of Britain maintain a unique and advanced position.

2. **Relations with Foreign Countries.** The great nations on the continent have frequently of late years become embroiled in strife; they are compelled to enter into alliances for purposes of defence, whilst Britain has happily been able to avoid collisions on the one hand, and to maintain a dignified and unfettered position on the other. Her strong hand has never been wanting in the defence of the weak and downtrodden, at the same time she has never needed to seek aggrandisement at the expense of other and less powerful nations. Her friendship is the desire of every continental nation; only the unjust and tyrannical need fear her anger.

3. **Discoveries.** The position of England has made her inhabitants a seafaring people, hence the tendency to explore has become natural. Her immense trade has required the constant opening out of fresh fields for commerce, and the rapid growth of the people in numbers has stimulated them to seek abodes on foreign and congenial soils.

4. **Commerce.** Owing to unparalleled development of our shipping, the English has become the chief carrying nation on the globe. The wants of the people, the demands for raw material for manufacture, and the interchange of manufactured goods for raw material, have all assisted in swelling the commerce of Great Britain to the enormous proportions which it now presents.

7. *Describe the most important river systems of England* or *Scotland, and account for the aggregation of population in certain river basins.*

(7) In England there are four river systems, each with dense populations associated with them. These are—

(*a*) The Tyne, Wear, and Tees; (*b*) The Thames; (*c*) The Bristol Channel and the Severn; (*d*) The Mersey, Dee, and Lune.

(1) The Tyne, Wear, and Tees are all in the vicinity of a mining and manufacturing industry, each has excellent accommodation near their mouths for shipping. Hence the remarkable development of Newcastle, Gateshead, and Shields, on the Tyne; of Sunderland, on the Wear; and of Darlington, Stockton, and Middlesborough, on or near the Tees.

(2) The Thames carries more shipping than any other similar water. The development of its trade is due to the remarkable growth of London, and to the tendency in modern times for people and their industries to congregate in large centres.

8. *To what part of the British Isles would you go to see the Broads, the Fens, the Black Country, Bogs, Tors, Forests, 'a Rock-bound Coast,' and the 'White Cliffs of Albion'?*

(8) The **Broads** are in Norfolk.

The **Fens**, in Lincolnshire, Cambridgeshire, and Huntingdon.

The **Black Country**, in Staffordshire mainly, but extending into N. Worcestershire and Warwickshire.

Bogs prevail in the central plain of Ireland.

Tors are the rocky summits on the moors of Devonshire.

Forests are distributed throughout the central and southern regions of England. In Durham and Northumberland the land between the dales is sometimes called by the same name.

A Rock bound coast is found along the Atlantic shores of Cornwall.

The white cliffs of Albion extend from Folkestone to Dover and thence to the South Foreland and Walmer.

9. *Where and what are the following?—*

Bornholm, Milo, Dalmatia, Bremen, St. Gothard, Dunkirk, Milan, Schleswig-Holstein, Tyrol, Brindisi, Palermo, and Abo? State concisely what you know about any FOUR *of these.*

(9) *Bornholm*, a Danish island, south of Sweden.
Milo, an island, one of the Cyclades, east of the Morea.
Dalmatia, one of the Hungarian provinces of Austria.
Bremen, a free city and port on the Weser.
St. Gothard, one of the highest summits in the Alps.
Dunkirk, a French port on the North East coast.
Milan, on the Olona, formerly capital of Lombardo-Venetia.
Schlewig-Holstein, a province in North Germany.
Tyrol, one of the German provinces of Austria.
Brindisi, an Italian port on the eastern coast of the peninsula.
Palermo, the capital of Sicily.
Abo, a port on the Gulf of Finland.

Abo, on the Gulf of Finland, at one time was the capital of Finland. In 1827, was almost destroyed by fire.

Palermo, the capital of Sicily, the fourth largest city in Italy and founded by the Phœnicians.

Brindisi, a port which owes its importance largely to being on the direct route between western Europe and Egypt and India.

The Tyrol is in the south west of the Austro-Hungarian Empire. It is situated on the flanks of the great Alpine mountain range; is rich in minerals. **Innsbruck** is the capital. **Gastein** is noted for its saline springs.

10. *Give an account of the German Empire under the following heads:—*

(1.) *Position in Europe.*
(2.) *Size and population.*
(3.) *Chief political divisions.*
(4.) *Chief rivers and towns.*
(5.) *Industries and manufactures.*

(10) (*a*) **Position.** Occupies a central position in Europe between the Baltic and the Alps.

(*b*) **Size and Population.** The area is nearly 212,000 square miles, and the population nearly 48,000,000.

(*c*) **Political divisions.**

(1) *There are four Kingdoms*, viz., Prussia, Bavaria, Wurtemburg, and Saxony.

(2) *Six grand-Duchies*:—Baden, Saxe-Weimar, Oldenburg, Mecklenburg-Strelitz, Mecklenburg-Schwerin, and Baden.

(3) The province of Alsace-Lorraine.

(*d*) **Rivers and Towns.**

RIVERS.	TOWNS.
Pregel	Königaberg.
Vistula	Danzig.
Oder	Stettin, Breslau.
Elbe	Hamburg, Magdeburg, Dessau, and Dresden.
Spree	Berlin.
Weser	Bremen, Meiningen
Rhine	Strasburg, Mannheim, Coblenz.
Moselle	Metz.
Main	Frankfort
Neckar	Heidelberg.
Danube	Ulm and Ratisbon.

(*e*) **Industries.** Agriculture is the principal industry. Silks, cottons, and hardware are manufactured in the Rhine province. In Saxony are woollen and porcelain industries. Vast ironworks are situated at Essen in Westphalia. In Silesia linen and woollen goods are made, especially at Breslau. German beer comes chiefly from Bavaria.

11. *Suppose a traveller made a tour by water from Vienna to Marseilles. What countries would he pass through, and what places would he see?*

(11) A traveller from Vienna to Marseilles would take boat on the Danube, and first sail through Austrian territory. At Passau he would enter Bavaria and pass the town of Ratisbon. By means of the Ludwig Canal he would reach the river Main, and passing Frankfort and Mayence reach the Rhine. Passing Strasburg a canal would carry his boat to the Doubs and thence viâ the Saone he would reach Lyons. His course now follows the Rhone, and passing Avignon the traveller would reach Marseilles.

(To be continued.)

—o—

Locke's Thoughts Concerning Education.

BY JOSEPH H. COWHAM, F.G.S.,

Lecturer on School Method: Westminster Training College.

IX.

RHETORIC and Logic being the arts that in the ordinary method usually follow immediately after grammar, it may perhaps be wondered that I have said so little of them. The reason is because of the little advantage young people receive by them: for I have seldom or never observed any one to get the skill of reasoning well or speaking handsomely by studying those rules which pretend to teach it: and therefore I would have a young gentleman take a view of them in the shortest systems that could be found, without dwelling long on the contemplation and study of these formalities. Right reasoning is founded on something else than the predicaments* and predicables,* and does not consist in talking in mode* and figure* itself. But 'tis beside my present business to enlarge upon this speculation. To come therefore to what we have in hand; if you would have your son reason well let him read Chillingworth,† and if you would have him speak well, let him be conversant in Tully,‡ to give him the true idea of eloquence, and let him read those things that are well writ in English, to perfect his style in the purity of our language.

['The old *Trivium* which all the "Educated" passed through,' says the Rev. R. H. Quick, 'consisted of Grammar, Logic and Rhetoric. The first was supposed to be "absolved" at school, the other two at the university. Logic still lingers at Oxford, though it has vanished at Cambridge. We find Locke very strongly against the disputations common in his time, but he seems to think some knowledge of logic should precede the study of mathematics.'

The value studying of good models of style in the learner's own language cannot be over-rated. The wonder is that so much time is devoted to the study of the classics of other languages, whilst those of our own are comparatively neglected. The reprints of to-day indicate the desire of those who are wishful to direct our reading, that English literature of real value may be placed within the reach of all. It should be remembered that the English pupil, when reading his own language, is free to concentrate his attention upon its style, whereas in attempting a more or less unknown language his effort must be expended to a considerable extent in mastering the various forms and their meanings.]

If the use and end of right reasoning, be to have right notions and a right judgment of things, to distinguish betwixt truth and falsehood, right and wrong, and to act accordingly; be sure not to let your son be bred up in the art and formality of disputing, either practising it himself, or admiring it in others; unless instead of an able man, you desire to have him an insignificant wrangler, opiniator in discourse, and priding himself in contradicting others or, which is worse, questioning everything, and thinking there is no such thing as truth to be sought, but only victory, in disputing. There cannot be anything so disingenuous, so misbecoming a gentleman, or any one who pretends to be a rational creature, as not to yield to plain reason, and the conviction of clear arguments. Is there anything more inconsistent with civil conversation, and the end of all debate, than not to take an answer, though never so full and satisfactory, but still to go on with the dispute, as long as equivocal sounds* can furnish (a *medius terminus*) a term to wrangle with on the one side, or a distinction on the other; whether pertinent or impertinent, sense or nonsense, agreeing with or contrary to what he had said before, it matters not. For this, in short, is the way and perfection of logical disputes, that the opponent never takes any answer, nor the respondent ever yields to any argument. This neither of them must do, whatever becomes of truth or knowledge, unless he will pass for a poor baffled wretch, and lie under the disgrace of not being able to maintain what-

† A writer of the seventeenth century whose works are justly renowned for the examples of reasoning they contain.

‡ Cicero.

ever he has once affirmed, which is the great aim and glory in disputing. Truth is to be found and supported by a mature and due consideration of things themselves, and not by artificial terms and ways of arguing: these lead not men so much into the discovery of truth, as into a captious and fallacious use of doubtful words, which is the most useless and most offensive way of talking, and such as leasts suits a gentleman or a lover of truth, of anything in the world.

[*Words versus things.* The conflict between the respective values of these as a means of education existed in the days of Locke and has continued to the present. The last few years have been remarkable for the increasing value placed by educationists upon bringing the youthful mind into more direct and constant contact with things. The knowledge thus acquired must necessarily be somewhat limited, for the acquisitions gained by actual contact with objects during a long life cannot be extensive compared with the vast mass of knowledge which an ordinarily well informed person is expected to possess. The value of an education in connection with things rests, however, not so much in the amount of information obtained as in the training which such education affords. Knowledge thus gained is full and exact as, *e.g.*, when the study of Geology is pursued mainly by an examination of typical hand specimens, and by the microscopical inspection of thin sections of rock, in order to determine their crystalline structure, and when also the arrangement of the strata is viewed during series of Geological excursions. How rich and full is the knowledge thus gained by the side of that acquired by reading alone.]

There can scarce be a greater defect in a gentleman, than not to express himself well, either in writing or speaking. But yet, I think, I may ask my reader, whether he does not know a great many, who live upon their estates, and so, with the name, should have the qualities of gentlemen, who cannot so much as tell a story as they should, much less speak clearly and persuasively in any business. This I think not to be so much their fault, as the fault of their education; for I must, without partiality, do my countrymen this right, that where they apply themselves, I see none of their neighbours outgo them. They have been taught rhetoric, but yet never taught how to express themselves handsomely with their tongues or pens, in the language they are always to use; as if the names of the figures that embellished the discourses of those who understood the art of speaking, were the very art and skill of speaking well. This, as all other things of practice, is to be learned, not by a few or a great many rules given, but by exercise and application, according to good rules, or rather patterns, till habits are got, and a facility of doing it well.

Agreeable hereunto, perhaps it might not be amiss, to make children, as soon as they are capable of it, often to tell a story of anything they know; and to correct at first the most remarkable fault they are guilty of in their way of putting it together. When that fault is cured, then to show them the next; and so on, till one after another, all, at least the gross ones, are mended. When they can tell tales pretty well, then it may be time to make them write them. The fables of *Æsop*, the only book almost that I know fit for children, may afford them matter for this exercise of writing *English*, as well as for reading and translating, to enter them in the Latin tongue. When they are got past the faults of grammar, and can join in a continued, coherent discourse the several parts of a story, without bald and unhandsome forms of transition (as is usual) often repeated, he that desires to perfect them yet farther in this, which is the first step to speaking well, and needs no invention, may have recourse to Tully, and by putting to practice those rules, which that master of eloquence gives in his first book De Inventione, § 20 * make them know wherein the skill and graces of a handsome narrative, according to the several subjects and designs of it, lie. Of each of which rules fit examples may be found out, and therein they may be shown how others have practised them. The ancient classic authors afford plenty of such examples, which they should be made not only to translate, but have set before them as patterns for their daily imitation.

[The first condition of expression whether oral or written, is the possession of full knowledge of the subject of discourse. When knowledge is vague and doubtful and only held in dubious possession by a string of words partially understood, there is no wonder that expression is halting and defective.

Locke suggests practice in speaking and writing, and wisely advises exercise as the chief condition of acquisition. He further suggests that early exercises should be upon familiar topics; 'to tell a story' is a simple but most effective beginning. Children, in oral instruction, cannot be better employed than in relating their own experiences.]

When they understand how to write English with due connection, propriety, and order, and are pretty well masters of a tolerable narrative style, they may be advanced to writing of letters; wherein they should not be put upon any strains of wit or compliment, but taught to express their own plain easy sense, without any incoherence, confusion, or roughness. And when they are perfect in this, they may, to raise their thoughts, have set before them the example of Voiture* for the entertainment of their friends at a distance, with letters of compliment, mirth, raillery, or diversion; and Tully's epistles,* as the best pattern, whether for business or conversation. The writing of letters has so much to do in all the occurrences of human life, that no gentleman can avoid showing himself in this kind of writing. Occasions will daily force him to make this use of his pen; which, besides the consequences that, in his affairs, his well or ill managing of it often draws after it, always lays him open to a severer examination of his breeding, sense, and abilities, than oral discourses, whose transient faults dying for the most part with the sound that gives them life, and so not subject to a strict review, more easily escape observation and censure.

[The training which practice in composition exercises yields is well set out by Locke. Whilst 'readiness' is associated with speech, 'exactness' is linked with writing. The practical value of the power of clear and simple statement in writing is very evident].

Had the methods of education been directed to their right end, one would have thought this, so necessary a part, could not have been neglected; whilst themes and verses in Latin, of no use at all, were so constantly everywhere pressed, to the racking of children's inventions beyond their strength, and hindering their cheerful progress in learning the tongues by unnatural difficulties. But custom has so ordained it, and who dares disobey? And would it not be very unreasonable to require of a learned country schoolmaster (who has all the tropes and figures in Farnaby's rhetoric* at his finger's ends) to teach his scholar to express himself handsomely in English when it appears to be so little his business or thought, that the boy's mother (despised, it is likely, as illiterate for not having read a system of logic and rhetoric) outdoes him in it?

To write and speak correctly gives a grace, and gains a favourable attention to what one has to say: and since it is English that an English gentleman will have constant use of, that is the language he should chiefly cultivate, and wherein most care should be taken to polish and perfect his style. To speak and write better Latin than English may make a man be talked of; but he will find it more to his purpose to express himself well in his own tongue, that he uses every moment, than to have the vain commendation of others for a very insignificant quality. This I find universally neglected, nor no care taken anywhere to improve young men in their own language that they may thoroughly understand and be masters of it. If anyone among us have a facility or purity more than ordinary in his mother tongue, it is owing to chance or his genius, or anything rather than to his education, or any care of his teacher. To mind what English his pupil speaks or writes is below the dignity of one bred up amongst Greek and Latin, though he have but little of them himself. These are the learned languages, fit only for learned men to meddle with and teach; English is the language of the illiterate vulgar. Though yet we see the polity of some of our neighbours† hath not thought it beneath the public care to promote and reward the improvement of their own language. Polishing and enriching their tongue is no small business amongst them: it hath colleges and stipends appointed it, and there is raised amongst them a great ambition and emulation of writing correctly; and we see what they are come to by it, and how far they have spread one of the worst languages possibly in this part of the world, if we look upon it as it was in some few reigns backward, whatever it be now. The great men among the Romans were daily exercising themselves in their own languages; and we find yet upon record the names of orators who taught some of their Emperors Latin, though it were their mothers' tongue.

'Tis plain the Greeks were yet more nice in theirs other speech was barbarous to them but their own, and no foreign language appears to have been studied or valued amongst that learned and acute people; though it be past doubt that they borrowed their learning and philosophy from abroad.

I am not here speaking against Greek and Latin; I think they ought to be studied, and the Latin at least understood well by every gentleman. But whatever foreign languages a young man meddles with (and the more he knows the better), that which he should critically study, and labour to get a facility, clearness, and elegancy to express himself in, should be his own; and to this purpose he should daily be exercised in it.

Mode and Figure. These are logical expressions. A *mode* being one of the many forms into which a syllogism may be cast, whilst a *figure* is a particular arrangement of the terms of the different propositions in a syllogism.

Predicaments or Categories. Logical terms for the classes into which things can be distributed. These are ten, and are named as follows:—(1) substance, (2) quantity, (3) quality, (4) relation, (5) action, (6) passion or suffering, (7) place, (8) time, (9) position, (10) habit or condition. Everything which can be affirmed must come under one or other of these highest predicates, which were described in the first treatise of Aristotle's *Organon*, called the Categories. *Jevon's Logic.*

Predicables. In logic there are five kinds of attributes which can be predicated of any subject. These are arranged under the following terms:—**Genus, Species, Difference, Property, Accident.**

Equivocal sounds, &c. 'Equivocation,' says Prof. Jevons, 'consists in the same term being used in two distinct senses; any of the three terms of the syllogism may be subject to this fallacy, but it is usually the *middle term* (*medius terminus*) which is used, in one sense, in one premise, and in another sense, in the other.'

Tropes and Figures, &c. A *trope* is a change in the signification of a word from a primary to a derivative sense, as when a stupid fellow is termed '*an ass.*' The term *figure* has already been explained. **Farnaby** was a successful London Schoolmaster whose work on *Rhetoric* was widely read.

Tully's Epistles. These letters of Cicero amount to upwards of 800 in number; they are upon a variety of topics, and extend over a period of 26 years. *De Inventione* is one of Cicero's rhetorical works, written in his early years, and afterwards discounted by him.

(To be continued.)

* The French founded the Académie Francaise in the seventeenth century in order to maintain the purity of their language.

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,
Ex-President of the N.U.E.T.

XII.

THE subjects appointed as examination tests in Essay Writing are very frequently such as have recently attracted public attention and been dealt with in addresses on the platform or in articles in periodical publications. One subject which for a long time has been largely discussed in both these ways is at the same time one on which teachers might very fairly be expected to be prepared to state their thoughts and opinions. These facts afford ample reason for the inclusion of this topic in the present series of specimen essays. The subject we refer to is Reading and its uses. There are many ways in which it may be treated, and many titles which might be chosen for an essay on such a subject. As most in harmony with our object we prefer to take a comprehensive title such as

THOUGHTS ON BOOKS AND GENERAL READING.

In these modern days books and reading occupy so large and important a place in our intellectual life that every educated person must have formed some more or less definite opinions respecting them; and it is well that our opinions should be clear and formed on sound principles rather than loose, vague, and unstable.

Some very obvious thoughts about books must be based on the fact of the vastness of their number and

the continuous increase in their production. It was De Quincey, we believe, who, on finding himself in the midst of the national collection of books at the British Museum made an estimate of the time it would take to read them all, and came to the melancholy conclusion that a long life spent entirely in rapid reading would suffice for the perusal of no more than an infinitesimal fraction of the vast multitude of volumes. The marvellous extension of book-making would greatly intensify this consideration at the present time, and a morbid mind might find all the more reason for despondency in such rapid extension.

A more reasonable conclusion, however, to thoughts of this kind would be to recognise the importance of wisdom in the choice of books for our own reading. Lord Bacon, with his usual clearness and conciseness, has left us his opinion on this matter in the familiar dictum:—'Some books are to be tasted, others to be swallowed, and some few to be chewed and digested.' A thoughtful person will scarcely need the explanatory sentences which follow this to understand that some books are not worth the time required to read them through, it will be enough to read parts of them. For others hasty reading will suffice to gather all that is important in them. While a smaller number demand careful reading throughout.

It is easy to understand that it is necessary to make a limited choice of books to read, and also that attention may very properly be bestowed in different degrees on those chosen. But, after all, the determination of what we shall read and how we shall read depends mainly on what is our object in reading. Bacon, with his unbounded love of knowledge and his thoroughly practical turn of mind, recognised in reading chiefly the means of gaining information and learning lessons from the records of experience. Hence the remark 'Reading maketh a full man.' Reading for him was mainly one of the great foundations of knowledge. And the increase of knowledge is undoubtedly one of the chief reasons for which most men read. Still, other objects may very properly be sought in books. It is important, however, that we should have some genuine purpose in our reading. Purposeless reading can scarcely be anything other than waste of time. Reading for recreation after severer tasks, or for mere amusement to while away an idle hour, may be quite legitimate. Such great serious thinkers as Carlyle and Darwin indulged themselves in their leisure time in light reading unmarked by the higher qualities of sterling fiction. Public men like Lord Iddesleigh and Mr. Balfour have sung the praises of desultory reading as an excusable and even useful form of mental relaxation. But there is little need to follow up their argument, for the temptations to desultory reading are too many and too powerful rather than too slight or too few.

In addition to the two leading objects of reading already noticed, namely the increase of knowledge, and mental recreation, there is the further object which may be aimed at in reading, of mental training. Many books deserve to be read, not so much from the information they convey to the reader, still less for the amusement they afford, but rather for their suggestiveness, their power of stimulating thought and cultivating the faculties of reason and imagination.

Whenever it is possible it is well that each of these three purposes should be kept in view in regulating our choice of reading. A good selection of books to form a course of reading for the general reader should include some in which instruction by the conveyance of information should be the chief feature, others in which the stimulation and guidance of the thinking powers should be prominent, and others which should serve to amuse and relieve the mind.

To teachers it is especially important that these considerations should be allowed due weight. Students and candidates preparing for examination are too apt to have their course of reading cramped and confined to manuals and text-books. Stores of facts so arranged as to save trouble and thought too often monopolise attention to the exclusion of those works which, being filled with the mind and soul of the writers, are calculated to form and train the minds of the readers. If the examination syllabus prescribes some works of standard literature for study the student should endeavour to read them so as to assimilate their essence, and not only to obtain a knowledge of verbal analysis and textual criticism. He should be thankful too for the opportunity of combining solid study with the higher pleasures of mental culture.

The remarks we have made on the selection of books are somewhat general: but we might throw out the suggestion that the subject is of some special importance to teachers on account of the influence they may exercise on the choice of reading for those who come under their instruction. In this age of cheap books and free libraries, when to Lord Bacon's three classes might well be added a fourth—those which are to be shunned like poison—it is highly desirable that children should acquire at school not only a love of reading, but some true taste for good literature. As tending to this end it is gratifying to find amongst the books prepared for school use an increasing number of interesting works of the highest character by the masters of classical English.

Another movement which gives promise of wholesome influence and therefore deserves recognition and encouragement is the establishment of Home Reading Circles on a plan adopted with much success in America. Through the operation of a society founded by the energy and enthusiasm of Dr. Paton of Nottingham, and starting with most distinguished patronage and support, it is proposed to offer such help as is most needed by the multitude of people whom our educational system furnishes with the power of reading, but who require further guidance to turn that power to the best use.

Many wise and eloquent men have spoken and written on the choice of books and the pleasures of reading. We have not space to summarise their opinions; we can only commend them to the reader's attention. In Carlyle's address to the Edinburgh Students on the Choice of Books, in Ruskin's eloquent lectures on Kings' Treasuries and Queens' Gardens, in Sir John Lubbock and Frederic Harrison's discourses on the Choice of Books, they will find much to interest and charm, and may catch from them and other book-lovers whom they approvingly quote something of that appreciative spirit which recognises in books the unfailing companions, friends, and comforters that enliven every dreary way, dissipate every care, and afford solace in every affliction.

(To be continued.)

Had the methods of education been directed to their right end, one would have thought this, so necessary a part, could not have been neglected; whilst themes and verses in Latin, of no use at all, were so constantly everywhere pressed, to the racking of children's inventions beyond their strength, and hindering their cheerful progress in learning the tongues by unnatural difficulties. But custom has so ordained it, and who dares disobey? And would it not be very unreasonable to require of a learned country schoolmaster (who has all the tropes and figures in Farnaby's rhetoric* at his finger's ends) to teach his scholar to express himself handsomely in English when it appears to be so little his business or thought, that the boy's mother (despised, it is likely, as illiterate for not having read a system of logic and rhetoric) outdoes him in it?

To write and speak correctly gives a grace, and gains a favourable attention to what one has to say: and since it is English that an English gentleman will have constant use of, that is the language he should chiefly cultivate, and wherein most care should be taken to polish and perfect his style. To speak and write better Latin than English may make a man be talked of; but he will find it more to his purpose to express himself well in his own tongue, that he uses every moment, than to have the vain commendation of others for a very insignificant quality. This I find universally neglected, nor no care taken anywhere to improve young men in their own language that they may thoroughly understand and be masters of it. If anyone among us have a facility or purity more than ordinary in his mother tongue, it is owing to chance or his genius, or anything rather than to his education, or any care of his teacher. To mind what English his pupil speaks or writes is below the dignity of one bred up amongst Greek and Latin, though he have but little of them himself. These are the learned languages, fit only for learned men to meddle with and teach; English is the language of the illiterate vulgar. Though yet we see the polity of some of our neighbours† hath not thought it beneath the public care to promote and reward the improvement of their own language. Polishing and enriching their tongue is no small business amongst them: it hath colleges and stipends appointed it, and there is raised amongst them a great ambition and emulation of writing correctly; and we see what they are come to by it, and how far they have spread one of the worst languages possibly in this part of the world, if we look upon it as it was in some few reigns backward, whatever it be now. The great men among the Romans were daily exercising themselves in their own languages; and we find yet upon record the names of orators who taught some of their Emperors Latin, though it were their mothers' tongue.

'Tis plain the Greeks were yet more nice in theirs other speech was barbarous to them but their own, and no foreign language appears to have been studied or valued amongst that learned and acute people; though it be past doubt that they borrowed their learning and philosophy from abroad.

I am not here speaking against Greek and Latin; I think they ought to be studied, and the Latin at least understood well by every gentleman. But whatever foreign languages a young man meddles with (and the more he knows the better), that which he should critically study, and labour to get a facility, clearness, and elegancy to express himself in, should be his own; and to this purpose he should daily be exercised in it.

Mode and Figure. These are logical expressions. A *mode* being one of the many forms into which a syllogism may be cast, whilst a *figure* is a particular arrangement of the terms of the different propositions in a syllogism.

Predicaments or Categories. Logical terms for the classes into which things can be distributed. These are ten, and are named as follows:—(1) substance, (2) quantity, (3) quality, (4) relation, (5) action, (6) passion or suffering, (7) place, (8) time, (9) position, (10) habit or condition. Everything which can be affirmed must come under one or other of these highest predicates, which were described in the first treatise of Aristotle's *Organon*, called the Categories. *Jevon's Logic.*

Predicables. In logic there are five kinds of attributes which can be predicated of any subject. These are arranged under the following terms:—**Genus, Species, Difference, Property, Accident.**

Equivocal sounds, &c. 'Equivocation,' says Prof. Jevons, 'consists in the same term being used in two distinct senses; any of the three terms of the syllogism may be subject to this fallacy, but it is usually the *middle term* (*medius terminus*) which is used, in one sense, in one premise, and in another sense, in the other.'

Tropes and Figures, &c. A *trope* is a change in the signification of a word from a primary to a derivative sense, as when a stupid fellow is termed '*an ass.*' The term *figure* has already been explained. **Farnaby** was a successful London Schoolmaster whose work on *Rhetoric* was widely read.

Tully's Epistles. These letters of Cicero amount to upwards of 800 in number; they are upon a variety of topics, and extend over a period of 26 years. *De Inventione* is one of Cicero's rhetorical works, written in his early years, and afterwards discounted by him.

(To be continued.)

* The French founded the Arcadémie Francaise in the seventeenth century in order to maintain the purity of their language.

—o—

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,
Ex-President of the N.U.E.T.

XII.

THE subjects appointed as examination tests in Essay Writing are very frequently such as have recently attracted public attention and been dealt with in addresses on the platform or in articles in periodical publications. One subject which for a long time has been largely discussed in both these ways is at the same time one on which teachers might very fairly be expected to be prepared to state their thoughts and opinions. These facts afford ample reason for the inclusion of this topic in the present series of specimen essays. The subject we refer to is Reading and its uses. There are many ways in which it may be treated, and many titles which might be chosen for an essay on such a subject. As most in harmony with our object we prefer to take a comprehensive title such as

THOUGHTS ON BOOKS AND GENERAL READING.

In these modern days books and reading occupy so large and important a place in our intellectual life that every educated person must have formed some more or less definite opinions respecting them; and it is well that our opinions should be clear and formed on sound principles rather than loose, vague, and unstable.

Some very obvious thoughts about books must be based on the fact of the vastness of their number and

the continuous increase in their production. It was De Quincey, we believe, who, on finding himself in the midst of the national collection of books at the British Museum made an estimate of the time it would take to read them all, and came to the melancholy conclusion that a long life spent entirely in rapid reading would suffice for the perusal of no more than an infinitesimal fraction of the vast multitude of volumes. The marvellous extension of book-making would greatly intensify this consideration at the present time, and a morbid mind might find all the more reason for despondency in such rapid extension.

A more reasonable conclusion, however, to thoughts of this kind would be to recognise the importance of wisdom in the choice of books for our own reading. Lord Bacon, with his usual clearness and conciseness, has left us his opinion on this matter in the familiar dictum:—'Some books are to be tasted, others to be swallowed, and some few to be chewed and digested.' A thoughtful person will scarcely need the explanatory sentences which follow this to understand that some books are not worth the time required to read them through, it will be enough to read parts of them. For others hasty reading will suffice to gather all that is important in them. While a smaller number demand careful reading throughout.

It is easy to understand that it is necessary to make a limited choice of books to read, and also that attention may very properly be bestowed in different degrees on those chosen. But, after all, the determination of what we shall read and how we shall read depends mainly on what is our object in reading. Bacon, with his unbounded love of knowledge and his thoroughly practical turn of mind, recognised in reading chiefly the means of gaining information and learning lessons from the records of experience. Hence the remark 'Reading maketh a full man.' Reading for him was mainly one of the great foundations of knowledge. And the increase of knowledge is undoubtedly one of the chief reasons for which most men read. Still, other objects may very properly be sought in books. It is important, however, that we should have some genuine purpose in our reading. Purposeless reading can scarcely be anything other than waste of time. Reading for recreation after severer tasks, or for mere amusement to while away an idle hour, may be quite legitimate. Such great serious thinkers as Carlyle and Darwin indulged themselves in their leisure time in light reading unmarked by the higher qualities of sterling fiction. Public men like Lord Iddesleigh and Mr. Balfour have sung the praises of desultory reading as an excusable and even useful form of mental relaxation. But there is little need to follow up their argument, for the temptations to desultory reading are too many and too powerful rather than too slight or too few.

In addition to the two leading objects of reading already noticed, namely the increase of knowledge, and mental recreation, there is the further object which may be aimed at in reading, of mental training. Many books deserve to be read, not so much from the information they convey to the reader, still less for the amusement they afford, but rather for their suggestiveness, their power of stimulating thought and cultivating the faculties of reason and imagination.

Whenever it is possible it is well that each of these three purposes should be kept in view in regulating our choice of reading. A good selection of books to form a course of reading for the general reader should include some in which instruction by the conveyance of information should be the chief feature, others in which the stimulation and guidance of the thinking powers should be prominent, and others which should serve to amuse and relieve the mind.

To teachers it is especially important that these considerations should be allowed due weight. Students and candidates preparing for examination are too apt to have their course of reading cramped and confined to manuals and text-books. Stores of facts so arranged as to save trouble and thought too often monopolise attention to the exclusion of those works which, being filled with the mind and soul of the writers, are calculated to form and train the minds of the readers. If the examination syllabus prescribes some works of standard literature for study the student should endeavour to read them so as to assimilate their essence, and not only to obtain a knowledge of verbal analysis and textual criticism. He should be thankful too for the opportunity of combining solid study with the higher pleasures of mental culture.

The remarks we have made on the selection of books are somewhat general: but we might throw out the suggestion that the subject is of some special importance to teachers on account of the influence they may exercise on the choice of reading for those who come under their instruction. In this age of cheap books and free libraries, when to Lord Bacon's three classes might well be added a fourth—those which are to be shunned like poison—it is highly desirable that children should acquire at school not only a love of reading, but some true taste for good literature. As tending to this end it is gratifying to find amongst the books prepared for school use an increasing number of interesting works of the highest character by the masters of classical English.

Another movement which gives promise of wholesome influence and therefore deserves recognition and encouragement is the establishment of Home Reading Circles on a plan adopted with much success in America. Through the operation of a society founded by the energy and enthusiasm of Dr. Paton of Nottingham, and starting with most distinguished patronage and support, it is proposed to offer such help as is most needed by the multitude of people whom our educational system furnishes with the power of reading, but who require further guidance to turn that power to the best use.

Many wise and eloquent men have spoken and written on the choice of books and the pleasures of reading. We have not space to summarise their opinions; we can only commend them to the reader's attention. In Carlyle's address to the Edinburgh Students on the Choice of Books, in Ruskin's eloquent lectures on Kings' Treasuries and Queens' Gardens, in Sir John Lubbock and Frederic Harrison's discourses on the Choice of Books, they will find much to interest and charm, and may catch from them and other book-lovers whom they approvingly quote something of that appreciative spirit which recognises in books the unfailing companions, friends, and comforters that enliven every dreary way, dissipate every care, and afford solace in every affliction.

(To be continued.)

How my School was Examined.

BY THE HEAD MASTER OF A LONDON SCHOOL.

STANDARD I.

Arithmetic.—The following sums were dictated and worked on slates:—

(1) 814 + 75 + 9 + 460 + 28.
(2) From 601 take 106.
(3) Take 77 from 770.
Answers.—(1) 1,386. (2) 495. (3) 693.

Writing.—The following ten words were written on slates as dictated:—

Ponds, Summer, Ghost, Monday, Stairs, Cheese, Fox, Apples, Cloak, Rabbits.

When the slate exercises were finished the children had to go in a line to show them to the Inspector, who marked the slates as he heard each child read from 'The Three Monkeys,' or Longman's New Reader, No. I.

Geography.—Questions were asked on the points of the compass, the geography of the neighbourhood, and the meaning of a map.

The children having drawn a sketch-plan of the school on their slates were asked to identify the rooms on it, to point out the corridor, and the position of things in their own class-room. What road near the school runs east and west? What street is parallel to that road? Where is the sun when you go out of school at noon? What is the opposite direction? When the sun is not shining how can people tell the direction in which they are going?

The piece recited was Miss Ingelow's 'Seven times One are Seven,' and questions were asked, such as, What is meant by 'I am seven times one to-day'? What by the lamb being 'only one times one'? When is the moon like 'a bow'? Why is the bee called 'velvet bee'? why 'a dusty fellow'? What is the 'gold' with which its legs are powdered? What is a turtle-dove?

Singing.—A short exercise was pointed on the modulator, and some tests given with the hand-signs. The two songs sung were 'Lightly Row,' and 'Gentle Evening Bendeth.'

STANDARD II.

Arithmetic.—Two sets of sums similar to the following were given to alternate boys.

A. (1) From 60,006 take 6,060.
(2) Multiply 15,476 by 57.
(3) Multiply 4,089 by 908.
(4) Divide 14,059 by 8.
B. (1) Take 909 from 60,006.
(2) Multiply 37,268 by 68.
(3) Multiply 5,706 by 704.
(4) Divide 42,376 by 9.
Answers.—*A.* (1) 53,946. (2) 882,132. (3) 3,712,812. (4) 1,757 + 3 over.
B. (1) 59,097. (2) 2,533,824. (3) 4,017,024. (4) 4,708 + 4.

Dictation.—The following passage was given from Longman's New Reader, No. II., p. 105.

'With these it swims so fast, that it can very easily catch the fish upon which it feeds. Its skin is covered with thick glossy hair, or fur, which keeps the seal warm, though the water in which it swims is as cold as ice. When the seals are hungry, they like to rest on the top of the ice.'

Reading was heard partly from Longman's New Reader, and partly from Nelson's 'Stories of Animals.' The piece prepared for recitation was Mrs. Heman's 'Casabianca.' For a grammar test the boys were asked to select nouns and verbs from the sentences they read.

Geography.—Questions such as the following were put, with a map of England hanging before the class:—What does geography mean? What is a mountain? What is a row of mountains called? What is the name of this chain? (Pennine chain). What do these crooked lines represent? What is a river? The name of this river? (Thames). Mention some other rivers. What are rivers which flow into other rivers? Where is the sun at night?

Mental Arithmetic.—If a woman bought 20 eggs and put 8 in a pudding, how many would be left to put in a cake? How many pence in half-a-crown? How many sixpences in half-a-crown? How many threepenny pieces in a shilling? If I bought 3d. worth of marbles, and paid a shilling, what change should I have?

STANDARD III.

Arithmetic.—Typical sets of sums.

A. (1) Divide 50,267 by 606.
(2) Add together £3 6s. 8d., £232 6s. 10d., £3,603 12s. 6½d., £18,008 3s. 0¾d., £6,094 11s. 6¾d.
(3) From £10,606 4s. 10½d. take £363 6s. 8½d.
(4) Twenty-seven inches of twine are required to tie up a parcel. How many parcels can be tied up with 18,684 inches of twine?

B. (1) Divide 800,765 by 365.
(2) £17 8s. 3½d. + £100,706 13s. 9¾d. + £1,889 19s. 8½d. + 7¼d. + 17s. 9d. + 3¾d.
(3) Subtract £1,607 13s. 4d. from £1,706 8s. 3¼d.
(4) Eighty-five boys had sixteen marbles each, and ten others had fifty-nine each. How many more would be required to make two thousand?

C. (1) Divide 471,840 by 478.
(2) Add £48 16s. 7¾d., £90,008 17s. 10¾d., £40,005 14s. 11¼d. £5,463 17s. 6½d., and 14s. 7½d.
(3) Take £804 14s. 11¼d. from ten thousand pounds.
(4) A woman has a sovereign, and spends 8s. 6d. at the draper's, and half that amount at the butcher's; how much has she left?

D. (1) Divide 906,952 by 728.
(2) Find the sum of £60,050 8s. 6¾d., £58,003 6s. 10½d., £38,016 7s. 0½d., 1s. 1¾d., and 7½d.
(3) Subtract £5,000 15s. 11¾d. from £90,000.
(4) A man paid his tailor £1 8s. 6d., his baker £2 17s. 8d., and his butcher £2 12s. 9d. How much had he left out of £7?

Answers.—*A.* (1) 82 + 575 over. (2) £27,942 0s. 8d. (3) £10,242 18s. 1¾d. (4) 692 parcels.

B. (1) 2,193 + 320 over. (2) £102,615 0s. 5¾d. (3) £98 14s. 11¼d. (4) 50.

C. (1) 987 + 54 over. (2) £135,528 1s. 7¾d. (3) £9,195 15s. 0¾d. (4) 7s. 3d.

D. (1) 1,245 + 592 over. (2) £156,070 4s. 3d. (3) £84,999 4s. 0¼d. (4) 1s. 1d.

Dictation :—The following passage was read over and dictated by the Inspector, from Longman's New Reader, page 115.

'In China and in many parts of the East Indies, where timber is scarce, entire houses are built of bamboo—posts, walls, floors and roofs all being made from this one material; and perhaps in no other way can so nice and well-finished a house be built so quickly and cheaply. Almost every kind of furniture is also made of the same material.'

Reading was heard from Moffatt's Historical Reader, Gill's Whitehall Geographical Reader, or Longmans' New Reader, No. III. The pieces prepared for recitation were, 'The Dog at his Master's Grave,' by Mrs. Sigourney, and 'The Soldier's Dream,' by Campbell. Questions in grammar were based on lines taken from the latter. What part of speech is 'sentinel' in 'sentinel stars'? What is 'set'? 'their'? 'watch'? and so on.

Geography :—Name a long river flowing into the Wash. Through what counties does the Great Ouse run? What towns stand on its banks? What is Bedford noted for? Who was born at Huntingdon? What are the occupations of the people in Bedfordshire? What towns are engaged in straw-plaiting? Where does the Thames rise? What counties does it flow between? Name some towns on its banks? What is Oxford noted for? Reading? Windsor? Name some tributaries of the Thames. What large river flows not far from the source of the Thames? Where does the Severn rise? Name a tributary of the Severn. Another? A town on the Wye? A sea-port in South Wales? What is the largest town in South Wales? What is Merthyr Tydvil noted for? What do you know of Swansea? of Cardiff?

Standard IV.

Arithmetic.—Typical cards.

A. (1) Multiply £999 19s. 11¾d. by 99.

(2) How many square inches are there in an acre and a half?

(3) Reduce 27 quarters, 3 pecks, 2 quarts to pints.

(4) A butcher bought 12 sheep and 5 cows for £149 10s. He gave 70s. for each of the sheep. What did each cow cost him?

B. (1) Multiply £95 17s. 8¾d. by 287.

(2) Reduce 618,302 ounces to stones.

(3) How many feet in 17 mls. 3 fur. 17 pls.?

(4) A man bought 4 sheep and 21 lambs for £69 15s. The sheep cost £3 each. What did he give for each of the lambs?

C. (1) Divide £76,814 4s. by 192.

(2) Multiply £69 18s. 3¾d. by 83.

(3) Reduce 506,880 inches to miles.

(4) If I buy oranges at 2 for 1½d. and sell them at 1d. each, what do I gain by selling 12 dozen?

D. (1) Multiply £10,097 15s. 5¼ by 381.

(2) Divide £46 11s. 11¼d. by 23.

(3) Reduce 10 chains 10 yds. 2 ft. to inches.

(4) If 25 cannon balls were shot off daily, each weighing 56 lbs., how many cwts. would be used in 16 days?

Answers.—*A.* (1) £98,999 17s. 11¼d. (2) 9,408,960 sq. in. (3) 6,938 pts. (4) £21 2s.

B. (1) £27,517 7s. 3½d. (2) 2,760 stones 3 lbs. 14 oz. (3) 92,020½ ft. (4) £2 15s.

C. (1) £400 1s. 6d. (2) £5,802 19s. 11½d. (3) 8 mls. (4) 3s.

D. (1) £3,301,971 8s. 0¾d. (2) £1,071 14s. 6¾d. (3) 8,304 in. (4) 200 cwts.

Writing.—The following passage was dictated from Nelson's New Royal Reader, No. IV., page 167 :—

'Those who knew him best, affirmed that Mr. Toil was a very worthy character, and that he had done more good, both to children and to grown people, than anybody else in the world. He had, however, a severe and ugly countenance; his voice was harsh; and all his ways and customs were disagreeable to our young friend Hugh Idle. The whole day long this terrible schoolmaster stalked about among his scholars with a big cane in his hand.'

Reading was tested from Longmans' New Historical Reader for Standard IV., Nelson's New Royal Reader, No. IV., and Gill's Albert Geographical Reader, No. IV. The piece recited was the 'Meeting of Marmion and Douglas' from Scott's poem. Questions were asked on the narfative and on the words.

Grammar.—The following sentence was written on the blackboard and parsed orally :—'I love my friends very much.' Questions were asked on number, person, mood, tense, &c.

Geography.—Where is the river St. Lawrence? In going up this river what important towns should we come to? Name an island east of Nova Scotia? For what is Newfoundland noted? Where is Vancouver's Island? What is it noted for?

Where is Limerick? For what is it noted? Where is Belfast? What is made there? Where is Lough Neagh? What do you know about this lake? Name some lakes in Galway. How are Loughs Corrib and Mask connected? What is the capital of Ireland? What river is it on? Where is Kingstown? Queenstown? Name the harbours on the South of Ireland. What is their chief trade?

What sort of coast has the west of Scotland? Where is Glasgow? For what is it noted? Where is Dundee? What manufacture is carried on there? What are the principal mountains of Scotland? Name the largest county of Scotland. Where is Perth? On what river does it stand? Name some other rivers of Scotland. What is the character of most of the Scotch rivers? Why are they rapid? What fish are caught in these rivers? Where is Hawick? What is it noted for? Where is Ben Lomond? Loch Lomond?

Mental Arithmetic.—Such questions as the following were asked :—

What is the eighth of a shilling? What fraction is left if ⅛ of a shilling is taken from a shilling? Add together ⅓ and ¼. Add ½ and ⅓. Which is the greater, a half or a third?

Singing.—A short voluntary was pointed on the modulator including long leaps, and the notes of transition *fe* and *ta*. A time test similar to the following was given—

| 1 :— :1.1 | 1 : :1 | 1.1 :1.1 :1.1 | 1 :— :1 |

And ear tests :

m f s m; s l f m; m s l t.

The songs sung were 'Rest, my Baby, Rest,' and 'Ere the Sun has Begun.'

STANDARD V.

Arithmetic.—Specimen sets of sums :—

A. (1) How much less is $\frac{3}{4}$ than $\frac{5}{6}$?

(2) Find by practice the cost of repairing a road 13 miles 6 fur. 34 pls. long, at £1 3s. 4d. per mile.

(3) Make out the following bill :—17 yds. of carpet at 1s. 9½d. per yd.; 30 screws at 1s. 6d. per dozen; 36 slates at 4d. for 12; 16¼ yds. of matting at 3s. 8d. per yd.; 14 pairs of cuffs at 6½d. per pair.

(4) If a man's yearly income is 550 guineas, and he spends £1 2s. 4d. per day, what does he save in a year?

B. (1) Find the value of $\frac{3}{4} + \frac{2}{3} + \frac{5}{6} + \frac{1}{2}$.

(2) Find the cost of 675 tons at 19s. 11½d. per ton.

(3) What would a man have left out of 500 guineas if he pays an income tax of 7d. in the £?

(4) Make out the following bill :—4 doz. and 4 prs. of gloves at 1s. 3d. per pair: 4½ doz. copybooks at 9s. per doz.; 47 tea-spoons at 11½d. each; 2 stones 7½ lbs. of flour at 2½d. per lb.; 13 collars at 5½d. each.

Answers.—*A.* (1) $\frac{1}{12}$. (2) £16 3s. 3¾d. (3) £1 10s. 5½d. + 3s. 9d. + 1s. + £2 19s. 7d. + 7s. 7d. = £5 2s. 4½d. (4) £169 18s. 4d.

B. (1) $2\frac{5}{6}$. (2) £673 11s. 10½d. (3) £509 13s. 9d. (4) £3 5s. + £2 0s. 6d. + £2 5s. 0½d. + 7s. 4¾d. + 5s. 11½d. = £8 3s. 10¾d.

Writing.—The inspector read over, and then told the following story of a puzzled traveller; which the boys had to reproduce.

'One day an old gentleman and his son were travelling in the North of England. They sat in two corners of a first-class carriage, the former with his back to the engine, while the latter faced the way they were going. After a time the train steamed into York Station. While they waited the engine was taken from the front of the train, and attached to the other end to draw it out of the station on another line. When the train proceeded on its journey, the face of the old gentleman wore a puzzled expression, and after thinking for some minutes he exclaimed to his son; "This is very strange. When we entered the station you were sitting opposite to me; now on leaving it, I am sitting opposite to you."'

STANDARD VI.

Arithmetic.—Specimen sets of sums :—

A. (1) Bring 13⅜ pints to the fraction of 3⅝ pks.

(2) Take 5·034 × ·06 from 1·62 ÷ ·0054.

(3) If the rent of 87 acres 2 roods 16 pls. be £109 10s., what will be the rent of 57$\frac{7}{15}$ acres?

(4) If a man pay $\frac{3}{10}$ of his annual income for rent, $\frac{7}{18}$ for clothing, ⅓ for other expenses, and has £32 15s. left, what was his annual income?

B. (1) Reduce ·75 of 18⅜ lbs. to the decimal of 2 tons.

(2) Find the Simple Interest on £840 3s. 4d. for 5¼ yrs. at 2½ per cent. per annum.

(3) To how many boys can I give ·025 of a crown out of £5?

(4) If 3½ lbs. of tea cost as much as 42⅜ lbs. of sugar, and 8 lbs. of sugar cost 1/6, what is the price of a lb. of tea?

Answers.—*A.* (1) $\frac{35}{144}$; (2) 299·69796; (3) £71 16s. 8d.; (4) £112 10s.

B. (1) ·003125; (2) £110 5s. 5¼d.; (3) 800 boys; (4) 2/6.

Writing.—The following subjects were given for composition, and the boys of Standards VI. and VII. had to choose one of them :—

A. Canals and Canal Boats.

B. A Visit to a Flower Show.

C. A letter describing a Visit to Sicily.

STANDARD VII.

Arithmetic.—Specimen Card.

(1) How many bags of coffee each weighing 105 lbs. at 14d. per lb. should be given in exchange for 7 casks, average weight 75 lbs. a cask, at 2/11 per lb.?

(2) A man bought an equal number of calves and sheep for £530. He paid for the calves £3·875 per head, and for the sheep £2·75 per head. How many of each did he buy?

3 Simplify $\frac{3\frac{1}{4} + 4\frac{1}{3}}{87\frac{1}{3} - 84\frac{1}{6}} \div 5\frac{1}{4}$.

(4) A man bought 70 lbs. of butter at 1/2 a lb. and 85 lbs. at 3/2. What would be the gain per cent. if he sold the whole at 3/6 per lb.?

Answers.—(1) 12½ bags. (2) 80 of each. (3) $\frac{1}{11}$. (4) $54\frac{8}{21}$ per cent.

Reading.—The boys of Standards V., VI. and VII. read in batches from Longman's Fifth Geographical Reader, Gardiner's Outlines of History, or Longman's New Reader, No. VI. Questions were asked on the meanings of words, the use of prefixes, facts in History and Geography. If a view on land is called a landscape, what name may be given to a view at sea? (Seascape).

Grammar.—Such questions were asked as—What is a sentence? What do we use sentences for? How is a sentence formed?

Parse and analyse :—

'In yon straight path a thousand
May well be stopped by three'

This was taken from Macaulay's Lay 'Horatius,' the poem prepared for recitation by the three highest standards.

Geography.—Standards V. to VII. had prepared the Geography of Europe. Each boy in turn was required to draw from memory one of the three maps prepared, —France, Italy, or the Basin of the Danube.

Where is the Baltic sea? Name the Gulfs into which it branches. Where is St. Petersburg? On what river? What is the port that protects it called? What is the largest river of Russia? Where does it rise? How high are the Valdai Hills? Name some towns on the Volga? What sea does it enter? What is Nijni Novgorod famous for? What fish is caught in the Volga? (Sturgeon.) What is made from it? Where is isinglass made? Where is Astrakhan? Where and what are the Steppes of Russia? What

other plains are similar to them? (The Pustas of Hungary.) Name the old capital of Poland. What minerals are found in Russia? What is a peninsula? Name some of the peninsulas of Europe. Name some islands of Europe. Where is Iceland? What Volcano does it contain? What is Lisbon noted for? Name the highest points of the Pyrenees? Name some of the chief towns of France. What are the most important productions of France? Where are its chief ports?

Singing.—Besides the sight test the higher standards were only required to sing some of the part songs prepared: 'The Choristers' and 'The Village Bellringers,' from French Trios.

—o—

Publications Reviewed.

Lost Dimplechin: A Fairy Cantata for Juvenile voices. By E. Glenton and Thomas Murby. London: T. Murby.

'Lost Dimplechin' is a bright and tuneful cantata containing several excellent numbers. Especially charming is Dimplechin's song 'Home,' a pathetic melody of great beauty. The whole work is suffused with a vigour and 'go' which would make it most effective in performance. The music is generally easy, though the fourth part is often too low for adequate rendering by young voices.

We are not particularly pleased with the overture, which consists mainly of the most prominent melodies of the work, loosely strung together, apparently without order or design. No 16, however, a *Tarentella*, is a spirited composition of considerable merit.

Mr. Murby's evident genius for melody makes us the more regret that the harmony is often faulty, and wanting in tonality and coherence. It gives us the impression that a great portion of the work was composed at the piano and not sufficiently revised. In a word, the harmonical structure lacks that careful polish so essential to a first-rate work of art.

Green Leaves: A set of Easy Pieces for the Pianoforte. By J. Clarkson. London and Manchester: John Heywood.

The set comprises—(1) Maiden Hair Waltz, (2) Mistletoe Polka, (3) Ivy (Melody), all of which are simple and pretty and just the thing for young learners on the Pianoforte.

A Text Book of Organic Chemistry. By A. Bernthsen. Translated by G. McGowan. London: Blackie and Son.

This is an important work of 500 pages, excellently printed and bound.

It is a translation of a text book written by Prof. Bernthsen, as he tells us in his preface, with the view of putting into the hands of his students a condensed, but strictly scientific, account of the main facts of the present state of the subject.

The book is distinguished by great clearness of statement and arrangement. While great brevity is often observable, room is found, where the importance of the subject justifies it, to give references to original sources, especially in some recent cases where the space did not allow of a fuller treatment. We think this is a book which will prove exceedingly useful to many students. It contains a large amount of well selected matter. It is evidently written by a man who not only knows his subject, but also knows how to present it.

The student who buys the book upon our recommendation must not be disappointed. The book contains no illustrations. It gives no directions for performing experiments. It is thus in striking contrast with two books, both of which are of great value for students who mean to understand organic chemistry,—Remsen's 'Organic Chemistry,' and Reynolds' 'Organic Chemistry.' But then such books are singularly deficient in such information as this book supplies. It will then be a sort of companion volume—a sort of complement to the treatises or any like them which we have just named. We believe it is one of the best books recently published on the subject. The best thanks of English students are due to Dr. McGowan for translating Dr. Bernthsen's work, and, above all, for translating it so well. Thanks are also due to the publishers for putting the book into the market in such good style, and at such a reasonable price. Translated books are often very dear.

The A.B.C. of Electricity. By W. H. Meadowcroft. Manchester: John Heywood.

This is a delightful little book of about 100 pages, beautifully printed on excellent paper, and capitally illustrated. What electricity has done already for man those who have time can read in this year's numbers of 'Scribner.' Now that we are expecting to have the electric light in our houses everybody will be wanting to know something about the subject. A few years ago the volt, ampère and ohm were 'caviare to the general;' on a par with adiabatical curves and entropy. This is all changed. We read in the newspapers of wires carrying currents of 2,000 volts pressure, and of the danger in touching such conductors. All the more important technical words, and many of the important phenomena of electric lighting, are explained in the little volume before us in the most attractive way. One could read the book through while travelling from London to Manchester, and though no one would pretend that the knowledge of electricity that could be obtained in that short time would be a very lasting acquisition or a very valuable one, yet all knowledge is preferable to ignorance, and provided it is accurate as far as it goes, and that it does not lead a person to think he knows a subject when as a fact he has only got a dim idea as to what it is all about, 'a little knowledge need not be a dangerous thing.' We recommend everyone who does not know anything about the light of the future, but who would like to do so in a short time and with little trouble, to buy this book, and read it through once or twice. We don't think he will regret his purchase. Perhaps we ought to state that a note from Mr. Edison says he has read the book, and finds the statements it contains are correct.

Choruses for Equal Voices. London: Curwen and Sons.

I heard the bells on Christmas Day, by B. M. Ramsey.—An effective piece of descriptive music, the parts being well-written and easy.

Come away, Fair Maidens, Waltz Song, by A. Geibel, is a graceful and tuneful chorus, suitable for the higher standards.

First Greek Grammar. By W. Gunion Rutherford, M.A., LL.D. London: Macmillan.

Easy Exercises in Greek Accidence. By H. G. Underhill, M.A. London: Macmillan.

A First Greek Reader. By F. H. Colson, M.A. London: Macmillan.

The third edition of Dr. Rutherford's excellent Greek Accidence is dated just ten year's later than its first edition. It was one of the first attempts to introduce the teaching of Greek grammar on a scientific philological basis, and its success is shown by the fact that the second edition, which this new one replaces, was reprinted four times in nine years. Nevertheless, we fear that the old

pre-scientific grammars are not yet wholly driven out of the field: we know of at least one great school which still uses throughout its forms a primer that ought long ago to have passed into desuetude, but, mainly through the support it receives from this one place, it has lately blossomed out in a new, though hardly improved edition.

The *Exercises* (re-arranged by Mr. Underhill) are intended to accompany the grammar, and to furnish both *vivâ voce* lessons and written exercises. It is of great importance to work the Greek forms well into boys' minds till they can use them fluently and with certainty, and this is the object which these exercises seek and seem well adapted to attain.

The *First Greek Reader* does not seem very strongly distinguished from the many other books which have of late years come into use bearing the same title. The lessons are carefully graduated, beginning with easy fables, and ending with the story of Socrates' death. Appended are notes and vocabulary, and a useful collection of English sentences, based upon the previous Greek extracts, and intended to be used for exercises, *vivâ voce* or in writing, at the convenience of the teacher.

Owing to the pressure on our space, we are compelled to hold over a number of Reviews.

—o—

Publications Received.

BACON, G. W., & CO.—Picturesque Geography, with plates (*Bacon*).

BELL, G., & SONS.—Horace's Odes, Book I. (*Rev. A. J. Macleane, M.A.*); Cæsar's Commentaries, Book II. (*G. Long, M.A.*); Notes on 'Hamlet' (*T. Duff Barnett, B.A.*).

BLACKIE & SON.—A Text Book of Organic Chemistry (*Dr. A. Bernthsen*); Blackie's Modern Cyclopedia, vol. III. (*Dr. Annandale*); Blackie's Science Text Books: First Mathematical Course; Geology (*W. Jerome Harrison*).

CASSELL & CO.—Modern School Reader, Standards 6 & 7.

CHAMBERS, W. & R.—Examination Book-keeping (*Dr. John Bell*).

CLAY, C. J., & SONS.—A Primer of Cursive Shorthand; Reading Practice in ditto (*Hugh L. Callendar, M.A.*).

CURWEN, J., & SONS.—The Child Pianist, Grade II.—1st, 2nd, 3rd and 4th steps; The Teacher's Guide to the Child Pianist, Grade II. (*Mrs. J. Spencer Curwen*); The Candidate in Music (*H. Fisher, Mus. Doc.*); Songs of the Royal Navy.

HEYWOOD, JOHN.—First Grade in Inorganic Chemistry (*Ward*); The A B C of Electricity (*Meadowcroft*); Elements of Physiography (*Prince*); Lessons in English Grammar (*Wood*); The Traveller, and the Deserted Village (*Goldsmith*); New Paragon Arithmetical Tests and Answers, Standard VII.; The Child's Bible Expositor (*Scholes*).

HOLDEN, A. M.—A Short Geography (*Prof. Meiklejohn*).

LONGMANS & CO.—Taciti Annalium—Liber XIV. (*Worthington*).

MARSHALL & CO.—The Infant Action Song and Recitation Book (*Mrs. Hibbert*).

MISCELLANEOUS.—Translation of Vergil's Æneid, Book 2 (*H. T. Dufton, B.A.*).

MURBY, T.—Cantata: Lost Dimpleton (*Thomas Murby*).

NELSON & SONS.—Higher-Grade English; The Royal English Classics: Scott's Marmion, Canto VI.; Milton's Paradise Lost, Book I.; Addison's Sir Roger de Coverley.

PITMAN, J., & SONS.—Reporting Hints and Practice (*Baker*); Charles Dickens's 'Christmas Carol' (*National Phonographic Library*).

SMITH, ELDER & CO.—The Cornhill Magazine. September.

THE CLARENDON PRESS.—Euripides' Hecuba (*Cecil H. Russell, M.A.*).

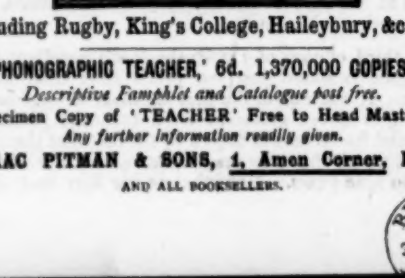
TO HEAD MASTERS.

See that your boys learn 'Pitman's Shorthand.'

Of inestimable value to those seeking appointments.

'The best system of shorthand.'—*Daily News.*
'Simple in character and based on scientific principles.'—*Practical Teacher.*
'Beautiful, fascinating, and efficient.'—*School Board Chronicle.*

Taught in over 1,000 Schools, Colleges, Institutions, &c.



Including Rugby, King's College, Haileybury, &c., &c.

'THE PHONOGRAPHIC TEACHER,' 6d. 1,370,000 COPIES SOLD.

Descriptive Pamphlet and Catalogue post free.
Specimen Copy of 'TEACHER' Free to Head Masters.
Any further information readily given.

ISAAC PITMAN & SONS, 1, Amen Corner, E.C.

AND ALL BOOKSELLERS.

CITY OF LONDON
DAY TRAINING COLLEGE.
WHITE STREET, MOORFIELDS, E.C.
(Two minutes' walk from Moorgate Street Station, 5 from Broad Street, Liverpool Street, and the Bank.)

CERTIFICATE, 1889.
SCHOLARSHIP, 1890.
PUPIL TEACHERS' CENTRAL CLASSES.

These Classes resume work after the holidays, on SATURDAY, 24th August.

SCIENCE AND ART CLASSES
Begin third week in September.

All the Classes in Science and Art are free to those who either are, have been, or will be, Students in the Certificate, Scholarship, or Pupil Teachers' Classes.
Tuition by Correspondence for all Examinations.
All applications to be addressed to PROFESSOR CUSACK, the Principal, as above.

JUST PUBLISHED, PRICE 2s.

CHAMBERS'S
EXAMINATION BOOK-KEEPING

Comprising Theory and Practice, with Civil Service and other Examination Papers fully solved. By JOHN BELL, LL.D.

The papers set extend over every variety of question, and the preparatory information will enable candidates to meet all the requirements of the Civil Service Examinations.

W. & R. CHAMBERS,
47, Paternoster Row, London; and Edinburgh.

BRITISH 30SE39

BLACKIE & SON'S PUBLICATIONS.

THE Century Readers

FRESH, VARIED, INTERESTING, AND INSTRUCTIVE.

With numerous Illustrations, specially designed and engraved for the Series.

FIRST PRIMER, cloth, 2½d.; SECOND PRIMER, cloth, 3d.; INFANT READER, cloth, 5d.

The Century Reader I., cloth boards ... 8d.	The Century Reader IV., cloth boards... 1s. 4d.
The Century Reader II., cloth boards ... 8d.	The Century Reader V., cloth boards... 1s. 6d.
The Century Reader III., cloth boards ... 1s. 0d.	The Century Reader VI., cloth boards... 1s. 6d.

READING SHEETS.

Consisting of the first 16 pages of PRIMER I. enlarged to 28 in. by 37 in., and beautifully printed on tough manilla paper. On roller, price 7s. 6d.

HOME-LESSON BOOKS.

Containing spelling lists, meanings, grammar, and poetry for repetition.

Reader I., 1d. | **Reader II.**, 2d. | **Reader III.**, 2½d. | **Reader IV.**, 3d. | **Reader V.**, 3d. | **Reader VI.**, 3d.

NOW READY, VOLS. I., II., and III.

To be completed in Eight Vols., published quarterly, square 8vo, cloth, 6s. each; or half-morocco, 8s. 6d. each.

BLACKIE'S MODERN CYCLOPEDIA.

A HANDY BOOK OF REFERENCE ON ALL SUBJECTS AND FOR ALL READERS, WITH NUMEROUS ENGRAVINGS AND MAPS.

Edited by **CHARLES ANNANDALE, M.A., LL.D.**, Editor of 'Ogilvie's Imperial Dictionary,' &c.

THE PRACTICAL TEACHER says:

'Again and again have we been asked for a compact, handy, reliable cyclopedia at a reasonable price. Here is the very thing.'

THE SCHOOL GUARDIAN says:

'For the teacher a work of this kind is almost indispensable, and we know of no other that combines in so high a degree the qualities of conciseness, comprehensiveness, and cheapness.'

THE SATURDAY REVIEW says:

'Will be found a boon to the general reader. Some handy form of encyclopædia has long been wanted. This is comprehensive, without being bulky. The information is succinctly given, sufficiently copious, and strictly relevant. With these good features must be noted the excellent type and paper, the useful woodcuts and maps, of these neatly-bound octavo volumes.'

BLACKIE'S SCIENCE TEXT-BOOKS.

Adapted to the Requirements of the Examinations of the Science and Art Department.

An Elementary Text-book of Geology. By W. Jerome Harrison, F.G.S., Science Demonstrator for the Birmingham School Board; Author of 'Earth Knowledge,' &c. Copiously Illustrated. Cloth, 2s. [*Just published.*

First Mathematical Course. Containing Arithmetic, Algebra, and Euclid as far as required in Subject V. (First Stage) of the Syllabus of the Science and Art Department. Cloth, with Answers, 2s.; without Answers, 1s. 9d.; Answers separate, 6d. [*Just published.*

An Elementary Text-book of Applied Mechanics. By David Allan Low (Whitworth Scholar), M.Inst.M.E. Cloth, 2s.

'An excellent little text-book, and one which we can recommend. The diagrams are especially good, and the descriptive portions are clear and concise.'—*Nature.*

Inorganic Chemistry, Theoretical and Practical. With a Course of Chemical Analysis and a Series of Examples in Chemical Arithmetic. By Professor A. Humboldt Sexton. Cloth, 2s. 6d.

'The work is well and clearly expounded, and forms a good general introduction to the study of chemistry.'—*Scotsman.*

Outlines of Natural Philosophy: a Text-book of Elementary Physics. By Professor Everett. Enlarged Edition. Cloth, 4s.

'A book of great merit; it possesses all the systematic arrangement and lucidity of the author's former publications.'—*Athenæum.*

Earth Knowledge: a Text-book of Physiography. By W. J. Harrison and H. R. Wakefield. Part I., Elementary, 1s. 6d.; Part II., Advanced, 2s.

'Carefully compiled, and the grouping of facts and the general arrangement will cause the volume to take a very useful place.'—*Schoolmaster.*

Elementary Text-book of Dynamics and Hydrostatics. By R. H. Pinkerton, B.A. (Oxon). Cloth, 3s. 6d.

'The fundamental units are thoroughly well explained, and, which is saying a great deal, they are used consistently throughout. In fact, from a mathematical point of view, the book leaves nothing to be desired.'—*Nature.*

An Elementary Text-book of Physiology. By J. M'Gregor-Robertson, M.A., M.B. Cloth, 4s.

'A good system of arrangement and clear expressive exposition distinguish this book. The definitions of terms are remarkably lucid and exact, a matter of the highest importance in a work of this kind. The woodcuts and explanatory diagrams are numerous and good.'—*Saturday Review.*

London: BLACKIE & SON, 49 & 50, Old Bailey.

CAMBRIDGE UNIVERSITY PRESS.

THE SMALLER CAMBRIDGE BIBLE FOR SCHOOLS.

The Smaller Cambridge Bible for Schools *will form an entirely new series of commentaries on some selected books of the Bible. It is expected that they will be prepared for the most part by the Editors of the larger series (The Cambridge Bible for Schools and Colleges). The volumes will be issued at a low price, and will be suitable to the requirements of preparatory and elementary schools. The first volumes of the series will be ready for publication before the end of the present year.*

IN THE PRESS.

The First and Second Books of Samuel. By Rev. Prof. KIRKPATRICK, B.D.

The Gospel according to St. Matthew. By Rev. A. CARR, M.A.

The Gospel according to St. Mark. By Rev. G. F. MACLEAR, D.D.

A SHORT HISTORY OF BRITISH INDIA.

(Uniform with Dr. Mill's 'Elementary Commercial Geography.') By Rev. E. S. CARLOS, M.A., late Head-Master of Exeter Grammar School. *[Preparing.*

PITT PRESS MATHEMATICAL SERIES.

THE ELEMENTS OF GEOMETRY AFTER EUCLID. Edited, with Notes and Exercises, by H. M. TAYLOR, M.A., Fellow and formerly Tutor of Trinity College, Cambridge. Books I. and II. *[In the Press.*

ARITHMETIC. By C. SMITH, M.A., Fellow and Tutor of Sidney Sussex College, Cambridge. *[Preparing.*

CURSIVE SHORTHAND.

(THE CAMBRIDGE SYSTEM.)

By HUGH L. CALLENDAR, M.A.,
Fellow of Trinity College, Cambridge.

Now ready, price 6d.

PRIMER OF CURSIVE SHORTHAND.

MANUAL OF CURSIVE SHORTHAND, 2s.

READING PRACTICE.

Printed Facsimilies of Cursive, 3d. each.

The Gospel according to St. Mark (First Half). The Vicar of Wakefield (Chaps. I. to V.)—Alice in Wonderland (Chap. VII.). *The last is written on a larger scale for beginners.*

COMPLETE CATALOGUES ON APPLICATION.

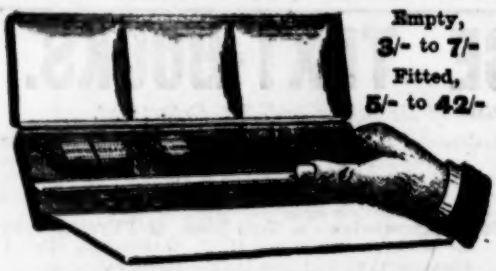
London: C. J. CLAY & SONS, Cambridge University Press Warehouse, Ave Maria Lane. Glasgow: 263, Argyll-st.

EYRE & SPOTTISWOODE'S

DRAWING INSTRUMENTS,

WATER COLOURS, OIL COLOURS,

And all Drawing Materials suitable for TECHNICAL and ART STUDENTS.



Empty, 3/- to 7/-
Fitted, 5/- to 42/-

JAPANNED TIN BOXES OF MOIST WATER COLOURS.

LEVER BAR ACTION AND DIVISIONS FOR EACH COLOUR.

N.B.—By means of the Patent Lever Bar spring action, any pan or half-pan of colour can be instantaneously taken out and replaced at will.

LIBERAL TERMS FOR SCHOOLS.

ILLUSTRATED CATALOGUE sent Post Free on application to

LIBERAL TERMS FOR QUANTITIES.

EYRE & SPOTTISWOODE,

LONDON—Great New St., Fleet St., E.C.

J. KEEFE, F.R.G.S., F.S.Sc. (London), &c.,

63, BOLD STREET, LIVERPOOL; also at MANCHESTER.

ACADEMY for Civil Service Clerkships, Naval Cadetships, Engineer Students, Ceylon and Hong Kong Cadetships, Army Preliminary, and Factory Inspectorships; also for Banks, Business, Medical and Legal, Preliminaries, and all Professional Examinations. Over 450 successes. TUITION BY CORRESPONDENCE for Country Students.

Prospectus Free.

'QUEEN'S SCHOLARSHIP EXAM.'

Candidates thoroughly Trained by Correspondence. No Fee unless successful first time. Backward students made to pass, and bright ones pushed into First Class.—Addressed envelope for particulars, list of successes, &c.

GEORGE HENRY SPARROW, Forest Gate, London, E.

N.B.—This being the eighth year of coach, with increasing success each year, there is little fear of failure.

Tuition by Correspondence

ESTABLISHED 1871.

PUPILS may now be entered for Certificate (1st and 2nd years), Scholarship, Science and Art, Matriculation, A.C.P., and Musical Examinations.

Pupils for Certificate (2nd year men) may take the course for Mathematics only, if desired.

Scripture (for December and July), Languages, Special Subjects, Shorthand, Book-keeping, &c., from 10s. per quarter.

We draw attention to our Courses for Pupil Teachers, Army Schoolmasters and Mistresses, Civil Service Branches, Medical and Legal Preliminary, and to our new department 'Notes and Queries.'

Intending Students and Enquirers (for whatever subject or branch) should write at once to our Office, naming this paper.

Address, JAMES JENNINGS and Co., Tuition by Correspondence Office, Deptford, London.

Post 8vo. Strongly bound. Price 7s.

CAREY'S

'GRADUS AD PARNASSUM.'

With the English Meanings. Recently Revised, Corrected, and Augmented by a member of the University of Cambridge.

London: Published by the Stationers' Company, Stationers' Hall, Ludgate Hill.

47th YEAR OF PUBLICATION.

USED IN THE LONDON BOARD SCHOOLS.

REDUCED FAC-SIMILE OF COVER.

WIGHTMAN'S ARITHMETICAL TABLE BOOK

NEW EDITION.

ENLARGED TO CROWN 16mo.

40 pages.

Many Million copies of this valuable little work have been sold.

MAY BE HAD OF

SIMPKIN MARSHALL & Co.; KENT & Co.; HAMILTON ADAMS & Co.;

OF THE PRINCIPAL SCHOLASTIC AGENCIES.

AND OF THE PUBLISHERS

WIGHTMAN & Co., 104 & 106, Regency Street, WESTMINSTER, LONDON.

JOHN HEYWOOD'S EDUCATIONAL PUBLICATIONS.

JOHN HEYWOOD'S NEW PARAGON READERS.

Profusely Illustrated.

Designed to fulfil in every respect the requirements of the Education Code, as regards size and number of lessons, as laid down in the Revised Instructions to H.M. Inspectors. The language and objects are designed so as to be suitable to the capacities of the children of the respective standards; due attention is paid to 'script;' the habits of exact observation, statement, and reasoning are exercised; the most difficult words are divided and accentuated; and all those high moral principles which should imbue the lives of the young are plainly set forth. Throughout the Series, moreover, careful attention is given to the paper, the binding, and the illustrations.

Primer I. ...32 pp., limp cloth, 2½d.
Primer II. ...48 pp., limp cloth, 3d.
Primer complete ...80 pp., cloth, 4d.
Reader I. .....96 pp., cloth, 6d.
Reader II. .....128 pp., cloth, 8d.
Reader III. ...200 pp., cloth, 1s. 0d.
Reader IV. ...224 pp., cloth, 1s. 4d.
Reader V. ...224 pp., cloth, 1s. 4d.
Reader VI. ...224 pp., cloth, 1s. 4d.

'Well bound, clearly printed, and suitably illustrated. The matter has been skilfully chosen. . . . the whole section reflecting much credit upon the editor.'—*Practical Teacher.*

'The reading matter is selected with admirable judgment. We can with confidence recommend this series as one of the very best.'—*National Schoolmaster.*

'Well up to the mark in all the essentials of a good and attractive set. . . the variety is great . . . not a lesson that might well have been omitted.'—*School Board Chronicle.*

ARITHMETICS.

NEW PARAGON ARITHMETICAL TESTS.

WRITTEN AND COMPILED BY

A PRACTICAL TEACHER,

AND DESIGNED TO MEET ALL THE REQUIREMENTS OF

"THE ROYAL COMMISSION CODE."

In Six Books. Standards II. to VII. Price One Penny Each. Each book containing 96 Tests of FOUR Exercises, or 384 selected Specimen Sums for One Penny. Answers in separate Books, limp cloth, flush, 6d. each.

'A useful little book. In each group there is a test in each rule—subtraction, multiplication, and division, as well as a problem. No teacher need take the trouble to compose test cards when such an abundance as in this book can be bought for a penny.'—*Schoolmaster.*

'The Answers are issued in a compact, handy form, strongly bound, likely to stand considerable wear and tear, and are essential to all who use the New Paragon Arithmetical Tests.'—*Schoolmaster.*

'Sure to be much valued for examination purposes during the last three months of the school year. The Answers, so far as we have tested them, are reliable.'—*Teachers' Aid.*

F'cap. 8vo, 90 pp., cloth, Sixpence. Answers, One Shilling.

JONES' STANDARD ARITHMETIC.

Also issued in Four Parts, 1d. each; cloth, 2½d. Answers, 6d.

New and Revised Edition. Five Million. Fiftieth Thousand.

'The exercises cover the whole ground of the standards; leave nothing untouched; illustrated in their hundreds, every rule of arithmetic. To master the book is really to master arithmetic.'—*Educational News.*

'Has held its own for more than a quarter of a century, and appears likely to retain its position for years to come.'—*Schoolmaster.*

'This old favourite, with its thousands of varied examples. The sale is sufficient proof of the popularity of the little volume. It deserves all the success it has achieved.'—*Teachers' Aid.*

32 pp. Price 2d. each Part. In cloth, complete, 1s.

THE "TRY" ARITHMETIC.

Specially adapted to meet the latest requirements of the Code, being the most perfect and best **Self-Testing** Arithmetic yet published. By Dennis Heywood, C.M. For Standards I. to VII.

'That teachers in large schools have found the book eminently useful and time-saving we can well believe.'—*Practical Teacher.*

THE NEW GRADED ARITHMETIC.

By C. H. Wykes, A.C.P.

Arranged in Seven Standards. Great care has been bestowed in its compilation, and it will be found correct throughout.

Standards I. to VI., 24 pp., 1d. each; Standard VII., 32 pp., 2d.

'Another new claimant for public favour, and a worthy competitor too. . . . The amount of matter in each part is wonderful at the price. The examples are well graded and exceedingly numerous, and the books are sure to receive a favourable recognition when they are once seen.'—*Schoolmaster.*

JOHN HEYWOOD, Publisher, Printer, Bookbinder, & School Furniture Manufacturer,

DEANSGATE and RIDGEFIELD, MANCHESTER; and 1, PATERNOSTER BUILDINGS, LONDON.

DR. BEACH'S

DAILY WORKING AND EXAMINATION CARDS

(ARITHMETIC).

PRICE, ONE SHILLING PER PACKET.

The Series consists of packets for Standards II. to VII. inclusive, and a packet of **'Long Tots.'**

Standards II., III., & IV., contain Forty Cards each; V., VI., and VII., Thirty-two Cards each; and the 'Long Tots' Forty Cards.

The first two packets provide on each Card both 'Daily Working Exercises' and an 'Examination Test,' and in the next four packets there is a further Test especially suited to Girls. There are thus **590** separate groups of Exercises.

Two copies of the answers are enclosed in each packet.

The 'DAILY WORKING EXERCISES'

I. Comprise all the Syllabus properly detailed and graduated.
II. Link together the work of the different Standards, the various Rules and Problems being so gradually introduced and of such a nature as easily to lead up to the higher rules.
III. Cover, Card by Card, a week's work, furnishing typical sums. The Head Teacher is thus much relieved, and the Assistant considerably helped;—and
IV. Afford continuous practice from Cards, commencing even immediately after the Scholar's promotion to a higher Standard.

The 'EXAMINATION TESTS'

I. Are compiled from an exhaustive and critical analysis of many hundred Departmental Tests.
II. Touch every required detail and run in the official groove.
III. Give due prominence and frequence to the *failing* points.
IV. Are properly and systematically varied;—and
V. Furnish separate exercises for Boys and Girls.

The 'LONG TOTS' are similar to, but easier than those used in the Civil Service Examinations, and are intended to be used in Standards IV. to VII. throughout the year; they provide a race course for a match against time, in accordance with the Code Regulation. '*The Inspector should* ALWAYS *require the Scholars of the Fourth Standard and upwards to add columns of pounds, shillings, and pence, in a specified time.*'

☞ **By working on the plan of these Cards, nearly cent. per cent. has been obtained for sixteen years.**

LONDON: JOSEPH HUGHES, PILGRIM STREET, LUDGATE HILL, E.C.

APPROVED SCHOOL BOOKS
BY DR. CORNWELL, F.R.G.S.

'We are qualified by ample trial of the books in our own classes, to speak to their great efficiency and value. We have never known so much interest evinced or so much progress made, as since we have employed these as our school-books.'—EDUCATIONAL TIMES.

A SCHOOL GEOGRAPHY. 79th Edition; 3s. 6d., or with 32 Maps on Steel, 5s. 6d.

'Very superior to the common run of such books. It contains a good deal of useful matter of a more practical kind than usual, which the exercises are likely to impress on the mind more deeply than by the parrot system.'—*Athenæum.*

A SCHOOL ATLAS. Consisting of Thirty Small Maps. A Companion Atlas to the Author's 'School Geography.' 2s. 6d., or 4s. coloured.

GEOGRAPHY FOR BEGINNERS. 59th Edition; 1s., or with 48 pp. of Questions, 1s. 4d. Questions, 6d.

'A very useful series of Educational Works, of which Dr. Cornwell is either author or editor. It ("The Geography for Beginners") is an admirable introduction. There is a vast difficulty in writing a good elementary book, and Dr. Cornwell has shown himself possessed of that rare combination of faculties which is required for the task.'—*John Bull.*

POETRY FOR BEGINNERS: A Selection of Short and Easy Poems for Reading and Recitation. 11th Edition, 1s.

ALLEN AND CORNWELL'S SCHOOL GRAMMAR. 62nd Edition; 2s. red leather, or 1s. 9d. cloth.

'The excellence of the grammar published by the late Dr. Allen and Dr. Cornwell makes us almost despair of witnessing any decided improvement in this department.'—*Athenæum.*

GRAMMAR FOR BEGINNERS. An Introduction to Allen and Cornwell's 'School Grammar.' 82nd Edition; 1s. cloth, 9d. sewed.

'This simple Introduction is as good a book as can be used.'—*Spectator.*

☞ *The Book is enlarged by a Section on Word-Building, with Exercises for Young Children.*

THE YOUNG COMPOSER. Progressive Exercises in English Composition. 46th Edition, 1s. 6d. KEY, 3s.

'The plan of the work is very superior. We are persuaded this little work will be found valuable to the intelligent instructor.'—*Westminster Review.*

SPELLING FOR BEGINNERS. A Method of Teaching Reading and Spelling at the same time. 3rd Edition, 1s.

London: SIMPKIN & CO.; HAMILTON & CO.; W. KENT & CO. Edinburgh: OLIVER & BOYD.

MADE WITH BOILING WATER.

EPPS'S

GRATEFUL—COMFORTING.

COCOA

MADE WITH BOILING MILK.

The 'Practical Teacher' Sale and Exchange Column.

I offer for Sale:—Vols. 1 to 7 of 'Teacher's Aid;' Capel's 'Arithmetic and Mensuration,' with Key; Gladman's 'School Work,' 7s. 6d.; Cox's 'History,' 4s. 6d.; 'Practical Teacher,' Vol. 7; Hughes's 'Class Geography,' 3s. 6d. (new edition); Cassel's 'Lessons in French,' 2s. 6d., Part I.; 'Helps to Higher Arithmetic' (Alfreton); Rick's 'Arithmetic, and How to Teach it; Rick's 'Pupil Teacher's Arithmetic;' 'Grammar,' by Daniells,' 4s. 6d. What offer for all or any?—Apply G. Lawrence, 40, Casterton-road, Mare-street, Hackney.

JOSEPH HUGHES'S PUBLICATIONS.

☞ **MAY BE ORDERED THROUGH ANY BOOKSELLER OR NEWSAGENT.**

Sixteen Parts, price 2d. each.

COWHAM'S
MULHÄUSER COPY-BOOKS.

Prepared in strict accordance with the instructions to H.M. Inspectors.

SCIENTIFIC	in Arrangement.
ARTISTIC	in Design.
UNIFORM	in Shape.
LEGIBLE and Beautiful	in Form.

These Copy-books have been specially prepared to meet the repeated demand for a Series of Books which supply Exercises in Writing arranged on a RATIONAL *and* SCIENTIFIC PLAN.

They introduce abundant help for the youngest pupils, and at the same time gradually secure a perfectly INDEPENDENT *and thoroughly* LEGIBLE STYLE.

The Copies display an artistic and simple beauty of design which stimulates the youthful learner to effort, and leads him rapidly to the acquisition of a BEAUTIFUL FORM OF HANDWRITING.

The System has received the sanction and high approval of the Committee of Council on Education, and Pupils who have been taught under it have obtained year by year the highest marks in the entire Kingdom for Penmanship.—See BLUE BOOKS, 1875 to 1880, under 'Westminster.'

The Teachers' Aid says:—'The whole style and get-up from first to last is admirable,' and Teachers would do well to examine the set and judge for themselves.'

The Schoolmaster says:—'Those teachers who are acquainted with and have adopted Mulhäuser's system in their schools will thank Mr. Cowham for these books . . . Mr. Cowham has successfully illustrated Mulhäuser's system of handwriting.'

The Journal of Education says:—'The lecturer of Westminster Training College has produced a set of copy-books which are attractive to the eye, carefully arranged, and well calculated to answer the requirements of Schools.'

A HEAD MASTER writes:—'I must express my warm approval of your 'Mulhäuser Copy Books.' The writing of all my standards has greatly improved since I adopted them in my School.'

LONDON: JOSEPH HUGHES, PUBLISHER, PILGRIM ST., LUDGATE HILL, E.C.